

APPENDIX E

Transportation Data

EXISTING CONDITIONS

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd

South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	2	6	0	7	5	6	5	1	2	6	1
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	3	3	8	0	9	7	8	7	1	3	8	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	49	38	9	47	38	7	9			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	49	38	9	47	38	7	9			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	99	99	100			100		
cM capacity (veh/h)	933	849	1073	940	849	1075	1610			1612		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	13	16	16	12
Volume Left	3	0	8	3
Volume Right	8	7	1	1
cSH	991	930	1610	1612
Volume to Capacity	0.01	0.02	0.00	0.00
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	8.7	8.9	3.6	1.6
Lane LOS	A	A	A	A
Approach Delay (s)	8.7	8.9	3.6	1.6
Approach LOS	A	A		

Intersection Summary			
Average Delay		5.9	
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

South Sutter
Existing Conditions - AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↖	↗	↖	↖	↖	↖	↖	↖
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	3	0	3	2	25	4	876	18	99	2113	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	2	3	0	3	2	28	5	995	20	112	2401	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		1			1							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3134	3631	1201	2432	3631	498	2401			995		
vC1, stage 1 conf vol	2626	2626		1005	1005							
vC2, stage 2 conf vol	508	1005		1427	2626							
vCu, unblocked vol	3134	3631	1201	2432	3631	498	2401			995		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	89	100	95	93	95	98			84		
cM capacity (veh/h)	18	32	177	72	30	518	196			691		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	6	0	3	2	28	5	498	498	20	112	1201	1201
Volume Left	2	0	3	0	0	5	0	0	0	112	0	0
Volume Right	0	0	0	0	28	0	0	0	20	0	0	0
cSH	24	1700	72	30	518	196	1700	1700	1700	691	1700	1700
Volume to Capacity	0.23	0.00	0.05	0.07	0.05	0.02	0.29	0.29	0.01	0.16	0.71	0.71
Queue Length 95th (ft)	18	0	4	6	4	2	0	0	0	14	0	0
Control Delay (s)	194.7	0.0	57.3	133.2	12.4	23.8	0.0	0.0	0.0	11.2	0.0	0.0
Lane LOS	F	A	F	F	B	C				B		
Approach Delay (s)	194.7		24.9			0.1				0.5		
Approach LOS	F		C									
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			75.1%			ICU Level of Service				D		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 3: Sankey Rd & Pacific Ave

South Sutter
 Existing Conditions - AM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	↩
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	50	70	46	23	7	5
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	61	85	56	28	9	6
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			146		244	104
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			146		244	104
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		99	99
cM capacity (veh/h)			1436		715	951

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	146	84	15
Volume Left	0	56	9
Volume Right	85	0	6
cSH	1700	1436	798
Volume to Capacity	0.09	0.04	0.02
Queue Length 95th (ft)	0	3	1
Control Delay (s)	0.0	5.2	9.6
Lane LOS		A	A
Approach Delay (s)	0.0	5.2	9.6
Approach LOS			A

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 4: Riego Rd & Power Line Rd






















South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	10	7	18	8	5	3	6	1	3	8	1
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	1	14	9	24	11	7	4	8	1	4	11	1
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	24	42	14	16								
Volume Left (vph)	1	24	4	4								
Volume Right (vph)	9	7	1	1								
Hadj (s)	-0.19	0.05	0.03	0.03								
Departure Headway (s)	3.8	4.0	4.1	4.1								
Degree Utilization, x	0.03	0.05	0.02	0.02								
Capacity (veh/h)	928	879	854	862								
Control Delay (s)	6.9	7.2	7.2	7.2								
Approach Delay (s)	6.9	7.2	7.2	7.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.1									
HCM Level of Service			A									
Intersection Capacity Utilization			18.4%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

South Sutter
Existing Conditions - AM Peak

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1773		1681	1680		1770	2888	1583	1770	3343	1583
Flt Permitted		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1773		1681	1680		1770	2888	1583	1770	3343	1583
Volume (vph)	4	8	5	587	24	21	3	873	200	50	2051	15
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)	4	9	5	638	26	23	3	949	217	54	2229	16
RTOR Reduction (vph)	0	5	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	13	0	346	339	0	3	949	217	54	2229	16
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split			Split			Prot			Free	Prot	Free
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases									Free			Free
Actuated Green, G (s)		3.7		29.3	29.3		0.9	67.4	130.1	7.1	73.6	130.1
Effective Green, g (s)		5.7		31.3	31.3		0.4	70.5	130.1	6.6	76.7	130.1
Actuated g/C Ratio		0.04		0.24	0.24		0.00	0.54	1.00	0.05	0.59	1.00
Clearance Time (s)		6.0		6.0	6.0		3.5	7.1		3.5	7.1	
Vehicle Extension (s)		1.0		1.0	1.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		78		404	404		5	1565	1583	90	1971	1583
v/s Ratio Prot		0.01		c0.21	0.20		0.00	0.33		c0.03	c0.67	
v/s Ratio Perm									c0.14			0.01
v/c Ratio		0.17		0.86	0.84		0.60	0.61	0.14	0.60	1.13	0.01
Uniform Delay, d1		59.9		47.3	47.0		64.8	20.3	0.0	60.5	26.7	0.0
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4		15.6	14.0		87.8	0.5	0.2	7.0	66.0	0.0
Delay (s)		60.3		62.9	61.0		152.6	20.8	0.2	67.4	92.7	0.0
Level of Service		E		E	E		F	C	A	E	F	A
Approach Delay (s)		60.3			61.9			17.3			91.4	
Approach LOS		E			E			B			F	
Intersection Summary												
HCM Average Control Delay			65.7			HCM Level of Service				E		
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			130.1			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			87.6%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 6: Riego Rd & Pacific Ave

South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	70	188	616	44	6	16
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	78	209	684	49	7	18
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	733				1073	709
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	733				1073	709
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				97	96
cM capacity (veh/h)	872				222	434

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	287	733	24
Volume Left	78	0	7
Volume Right	0	49	18
cSH	872	1700	344
Volume to Capacity	0.09	0.43	0.07
Queue Length 95th (ft)	7	0	6
Control Delay (s)	3.3	0.0	16.3
Lane LOS	A		C
Approach Delay (s)	3.3	0.0	16.3
Approach LOS			C

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 7: Riego Rd & Natomas Rd

South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	193	0	36	656	7	2	2	18	6	13	2
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	217	0	40	737	8	2	2	20	7	15	2
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	218	785	25	24								
Volume Left (vph)	1	40	2	7								
Volume Right (vph)	0	8	20	2								
Hadj (s)	0.04	0.04	-0.44	0.03								
Departure Headway (s)	4.9	4.3	5.7	6.2								
Degree Utilization, x	0.30	0.95	0.04	0.04								
Capacity (veh/h)	725	823	599	549								
Control Delay (s)	10.0	40.2	9.0	9.5								
Approach Delay (s)	10.0	40.2	9.0	9.5								
Approach LOS	A	E	A	A								
Intersection Summary												
Delay			32.5									
HCM Level of Service			D									
Intersection Capacity Utilization			60.5%	ICU Level of Service								B
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↗	↗
Sign Control		Stop	Stop		Stop	
Volume (vph)	5	227	692	77	66	18
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	5	236	721	80	69	19
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	242	721	80	88		
Volume Left (vph)	5	0	0	69		
Volume Right (vph)	0	0	80	19		
Hadj (s)	0.04	0.03	-0.67	0.06		
Departure Headway (s)	5.2	5.1	4.3	6.2		
Degree Utilization, x	0.35	1.01	0.10	0.15		
Capacity (veh/h)	688	702	815	557		
Control Delay (s)	10.9	57.6	6.6	10.3		
Approach Delay (s)	10.9	52.5		10.3		
Approach LOS	B	F		B		
Intersection Summary						
Delay			40.3			
HCM Level of Service			E			
Intersection Capacity Utilization			47.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

South Sutter
 Existing Conditions - AM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	↘
Sign Control	Stop			Stop	Stop	
Volume (vph)	258	35	57	705	64	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	280	38	62	766	70	18
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	280	38	828	88		
Volume Left (vph)	0	0	62	70		
Volume Right (vph)	0	38	0	18		
Hadj (s)	0.03	-0.67	0.05	0.07		
Departure Headway (s)	5.4	4.7	4.7	6.4		
Degree Utilization, x	0.42	0.05	1.09	0.16		
Capacity (veh/h)	655	744	749	542		
Control Delay (s)	11.1	6.8	81.2	10.5		
Approach Delay (s)	10.6		81.2	10.5		
Approach LOS	B		F	B		
Intersection Summary						
Delay			57.9			
HCM Level of Service			F			
Intersection Capacity Utilization			68.4%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	253	5	86	714	31	9	6	34	29	4	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	1	258	5	88	729	32	9	6	35	30	4	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	264	848	50	36
Volume Left (vph)	1	88	9	30
Volume Right (vph)	5	32	35	2
Hadj (s)	0.02	0.03	-0.35	0.17
Departure Headway (s)	5.0	4.5	6.0	6.5
Degree Utilization, x	0.37	1.07	0.08	0.06
Capacity (veh/h)	703	778	573	521
Control Delay (s)	11.0	72.7	9.5	10.0
Approach Delay (s)	11.0	72.7	9.5	10.0
Approach LOS	B	F	A	A

Intersection Summary			
Delay		54.6	
HCM Level of Service		F	
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	6	307	865	8	17	4
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	6	316	892	8	18	4
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	900				1225	896
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	900				1225	896
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				91	99
cM capacity (veh/h)	755				196	339

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	323	900	22
Volume Left	6	0	18
Volume Right	0	8	4
cSH	755	1700	213
Volume to Capacity	0.01	0.53	0.10
Queue Length 95th (ft)	1	0	8
Control Delay (s)	0.3	0.0	23.8
Lane LOS	A		C
Approach Delay (s)	0.3	0.0	23.8
Approach LOS			C

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

South Sutter
Existing Conditions - AM Peak

	→	↘	↙	←	↖	↗
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)	283	48	389	836	46	224
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	295	50	405	871	48	233
RTOR Reduction (vph)	0	31	0	0	0	162
Lane Group Flow (vph)	295	19	405	871	48	71
Turn Type		Perm	Prot		pm+ov	
Protected Phases	2		1	6	4	1
Permitted Phases		2				4
Actuated Green, G (s)	13.1	13.1	10.3	27.0	1.7	12.0
Effective Green, g (s)	15.1	15.1	9.9	29.0	2.0	11.9
Actuated g/C Ratio	0.39	0.39	0.25	0.74	0.05	0.31
Clearance Time (s)	6.0	6.0	3.6	6.0	4.3	3.6
Vehicle Extension (s)	2.0	2.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)	721	613	449	1385	91	645
v/s Ratio Prot	0.16		c0.23	c0.47	c0.03	0.03
v/s Ratio Perm		0.01				0.02
v/c Ratio	0.41	0.03	0.90	0.63	0.53	0.11
Uniform Delay, d1	8.7	7.4	14.1	2.4	18.0	9.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	20.6	0.6	2.5	0.0
Delay (s)	8.8	7.4	34.7	3.1	20.6	9.8
Level of Service	A	A	C	A	C	A
Approach Delay (s)	8.6			13.1	11.6	
Approach LOS	A			B	B	
Intersection Summary						
HCM Average Control Delay			12.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			39.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization			54.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

South Sutter
 Existing Conditions - AM Peak

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
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3464		1770	3539	1583	1770	3539	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3464		1770	3539	1583	1770	3539	1583	1770	1863	1583
Volume (vph)	294	196	32	261	587	61	6	502	270	38	386	639
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	327	218	36	290	652	68	7	558	300	42	429	710
RTOR Reduction (vph)	0	14	0	0	0	49	0	0	208	0	0	335
Lane Group Flow (vph)	327	240	0	290	652	19	7	558	92	42	429	375
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases						8			2			6
Actuated Green, G (s)	19.9	26.0		17.8	23.9	23.9	0.5	26.3	26.3	2.2	28.0	28.0
Effective Green, g (s)	19.9	28.0		17.8	25.9	25.9	0.5	28.3	28.3	2.2	30.0	30.0
Actuated g/C Ratio	0.22	0.30		0.19	0.28	0.28	0.01	0.31	0.31	0.02	0.33	0.33
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	382	1051		341	993	444	10	1085	485	42	606	515
v/s Ratio Prot	c0.18	0.07		0.16	c0.18		0.00	0.16		c0.02	0.23	
v/s Ratio Perm						0.01			0.06			c0.24
v/c Ratio	0.86	0.23		0.85	0.66	0.04	0.70	0.51	0.19	1.00	0.71	0.73
Uniform Delay, d1	34.8	24.1		36.0	29.3	24.2	45.8	26.3	23.6	45.0	27.3	27.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.9	0.2		17.4	2.0	0.1	101.3	0.8	0.4	138.9	4.6	6.0
Delay (s)	51.7	24.3		53.4	31.3	24.3	147.1	27.1	23.9	183.9	31.9	33.6
Level of Service	D	C		D	C	C	F	C	C	F	C	C
Approach Delay (s)		39.7			37.2			27.0			38.3	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay			35.5				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			92.3				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			69.5%				ICU Level of Service				C	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

South Sutter
 Existing Conditions - AM Peak
























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	3	13	4	23	56	3	6	2	3	2	30	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	15	5	27	66	4	7	2	4	2	35	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	24	96	13	42
Volume Left (vph)	4	27	7	2
Volume Right (vph)	5	4	4	5
Hadj (s)	-0.06	0.07	-0.02	-0.02
Departure Headway (s)	4.1	4.1	4.2	4.2
Degree Utilization, x	0.03	0.11	0.02	0.05
Capacity (veh/h)	865	859	825	839
Control Delay (s)	7.2	7.6	7.2	7.4
Approach Delay (s)	7.2	7.6	7.2	7.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay		7.5	
HCM Level of Service		A	
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
 15: Elverta Rd & Hwy 99

South Sutter
 Existing Conditions - AM Peak

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.94		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1737		1681	1676		1770	2888	1583	1770	3343	1583
Flt Permitted		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1737		1681	1676		1770	2888	1583	1770	3343	1583
Volume (vph)	3	9	10	424	20	22	37	1051	72	34	2582	27
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	3	10	11	451	21	23	39	1118	77	36	2747	29
RTOR Reduction (vph)	0	11	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	13	0	250	243	0	39	1118	77	36	2747	29
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Split			Prot		Free		Prot		Free
Protected Phases	7	7	8		8	5	2			1	6	
Permitted Phases								Free				Free
Actuated Green, G (s)	4.9		21.1		21.1	7.1	110.9	166.4	6.9	110.7	166.4	
Effective Green, g (s)	6.9		23.1		23.1	6.6	114.0	166.4	6.4	113.8	166.4	
Actuated g/C Ratio	0.04		0.14		0.14	0.04	0.69	1.00	0.04	0.68	1.00	
Clearance Time (s)	6.0		6.0		6.0	3.5	7.1		3.5	7.1		
Vehicle Extension (s)	1.0		1.0		1.0	2.2	2.0		2.2	2.0		
Lane Grp Cap (vph)	72		233		233	70	1979	1583	68	2286	1583	
v/s Ratio Prot	c0.01		c0.15		0.15	c0.02	0.39		0.02	c0.82		
v/s Ratio Perm								c0.05			0.02	
v/c Ratio	0.19		1.07		1.04	0.56	0.56	0.05	0.53	1.20	0.02	
Uniform Delay, d1	77.0		71.7		71.7	78.5	13.5	0.0	78.5	26.3	0.0	
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5		79.7		71.0	6.2	1.2	0.1	4.3	95.2	0.0	
Delay (s)	77.5		151.3		142.6	84.7	14.6	0.1	82.8	121.5	0.0	
Level of Service	E		F		F	F	B	A	F	F	A	
Approach Delay (s)	77.5		147.0				15.9			119.8		
Approach LOS	E		F				B			F		
Intersection Summary												
HCM Average Control Delay	94.4		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.11											
Actuated Cycle Length (s)	166.4		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	97.6%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	6	105	4	113	454	1	2	20	29	5	31	10
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	6	112	4	120	483	1	2	21	31	5	33	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	122	604	54	49
Volume Left (vph)	6	120	2	5
Volume Right (vph)	4	1	31	11
Hadj (s)	0.02	0.07	-0.30	-0.07
Departure Headway (s)	4.9	4.4	5.4	5.6
Degree Utilization, x	0.17	0.74	0.08	0.08
Capacity (veh/h)	701	801	602	573
Control Delay (s)	8.9	18.9	8.8	9.1
Approach Delay (s)	8.9	18.9	8.8	9.1
Approach LOS	A	C	A	A

Intersection Summary			
Delay		16.2	
HCM Level of Service		C	
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

South Sutter
 Existing Conditions - AM Peak



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)	13	124	2	3	505	4	3	0	6	4	1	60
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	138	2	3	561	4	3	0	7	4	1	67
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	566			140			803	740	139	744	739	563
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	566			140			803	740	139	744	739	563
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 %	99			100			99	100	99	99	100	87
cM capacity (veh/h)	1006			1443			260	339	909	324	339	526

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	154	3	566	10	72
Volume Left	14	3	0	3	4
Volume Right	2	0	4	7	67
cSH	1006	1443	1700	496	502
Volume to Capacity	0.01	0.00	0.33	0.02	0.14
Queue Length 95th (ft)	1	0	0	2	12
Control Delay (s)	0.9	7.5	0.0	12.4	13.4
Lane LOS	A	A		B	B
Approach Delay (s)	0.9	0.0		12.4	13.4
Approach LOS				B	B

Intersection Summary		
Average Delay		1.6
Intersection Capacity Utilization	37.6%	ICU Level of Service A
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

South Sutter
 Existing Conditions - AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	207	486	2	3	7
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	3	238	559	2	3	8
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	561				805	560
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	561				805	560
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	98
cM capacity (veh/h)	1010				351	528

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	241	561	11
Volume Left	3	0	3
Volume Right	0	2	8
cSH	1010	1700	458
Volume to Capacity	0.00	0.33	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.2	0.0	13.1
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	13.1
Approach LOS			B

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

South Sutter
 Existing Conditions - AM Peak



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)	6	200	4	52	470	5	5	11	43	10	16	14
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	7	230	5	60	540	6	6	13	49	11	18	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	546			234			934	911	232	964	911	543
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	546			234			934	911	232	964	911	543
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 %	99			96			97	95	94	94	93	97
cM capacity (veh/h)	1023			1333			217	260	807	204	260	540

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	241	606	68	46
Volume Left	7	60	6	11
Volume Right	5	6	49	16
cSH	1023	1333	497	293
Volume to Capacity	0.01	0.04	0.14	0.16
Queue Length 95th (ft)	1	4	12	14
Control Delay (s)	0.3	1.2	13.4	19.6
Lane LOS	A	A	B	C
Approach Delay (s)	0.3	1.2	13.4	19.6
Approach LOS			B	C

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

South Sutter
Existing Conditions - AM Peak















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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	211	139	151	401	448	225	154	517	92	95	768	249
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	245	162	176	466	521	262	179	601	107	110	893	290
RTOR Reduction (vph)	0	0	137	0	0	192	0	0	68	0	0	193
Lane Group Flow (vph)	245	162	39	466	521	70	179	601	39	110	893	97
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	9.9	18.6	18.6	14.3	23.3	23.3	8.1	32.1	32.1	5.3	29.3	29.3
Effective Green, g (s)	11.4	20.3	20.3	15.8	24.7	24.7	9.6	33.8	33.8	6.8	31.0	31.0
Actuated g/C Ratio	0.12	0.22	0.22	0.17	0.27	0.27	0.10	0.36	0.36	0.07	0.33	0.33
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	422	775	347	585	943	422	356	1854	577	252	1700	529
v/s Ratio Prot	0.07	0.05		c0.14	c0.15		c0.05	c0.12		0.03	c0.18	
v/s Ratio Perm			0.02			0.04			0.02			0.06
v/c Ratio	0.58	0.21	0.11	0.80	0.55	0.17	0.50	0.32	0.07	0.44	0.53	0.18
Uniform Delay, d1	38.4	29.6	29.0	36.9	29.2	26.1	39.3	21.2	19.2	41.1	24.9	21.9
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	1.3	0.4	0.4	6.9	1.2	0.4	0.4	0.2	0.1	0.4	0.6	0.4
Delay (s)	39.7	30.0	29.4	43.9	30.4	26.5	39.7	21.5	19.3	41.6	25.5	22.3
Level of Service	D	C	C	D	C	C	D	C	B	D	C	C
Approach Delay (s)		33.9			34.6			24.9			26.2	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

South Sutter
 Existing Conditions - AM Peak

												
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	2	5	0	7	860	0	0	0	115	0	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	2	6	0	8	1012	0	0	0	135	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	8			2			12	11	2	11	11	8
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	8			2			12	11	2	11	11	8
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			100			100	100	100	87	100	100
cM capacity (veh/h)	1612			1620			1004	884	1082	1007	884	1074
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2						
Volume Total	2	6	8	1012	135	1						
Volume Left	0	0	0	0	135	0						
Volume Right	0	6	0	1012	0	1						
cSH	1700	1700	1700	1700	1007	1074						
Volume to Capacity	0.00	0.00	0.00	0.60	0.13	0.00						
Queue Length 95th (ft)	0	0	0	0	12	0						
Control Delay (s)	0.0	0.0	0.0	0.0	9.1	8.4						
Lane LOS					A	A						
Approach Delay (s)	0.0		0.0		9.1							
Approach LOS					A							
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			56.6%		ICU Level of Service		B					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

South Sutter
 Existing Conditions - AM Peak















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	116	1	0	860	109	7	0	273	0	0	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	132	1	0	977	124	8	0	310	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)												
pX, platoon unblocked												
vC, conflicting volume	977			132			1109	1109	132	1419	1109	977
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	977			132			1109	1109	132	1419	1109	977
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			100			96	100	66	100	100	100
cM capacity (veh/h)	706			1453			187	210	918	76	210	304

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	132	1	977	124	8	310
Volume Left	0	0	0	0	8	0
Volume Right	0	1	0	124	0	310
cSH	1700	1700	1700	1700	187	918
Volume to Capacity	0.08	0.00	0.57	0.07	0.04	0.34
Queue Length 95th (ft)	0	0	0	0	3	38
Control Delay (s)	0.0	0.0	0.0	0.0	25.1	10.9
Lane LOS					D	B
Approach Delay (s)	0.0		0.0		11.3	
Approach LOS					B	

Intersection Summary		
Average Delay		2.3
Intersection Capacity Utilization	55.3%	ICU Level of Service
Analysis Period (min)		15
		B

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

South Sutter
 Existing Conditions - AM Peak

												
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	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)	0	391	77	281	571	0	114	0	110	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)	0	425	84	305	621	0	124	0	120	0	0	0
RTOR Reduction (vph)	0	0	55	0	0	0	0	0	103	0	0	0
Lane Group Flow (vph)	0	425	29	305	621	0	124	0	17	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		13.5	13.5	10.5	27.5		6.4		6.4			
Effective Green, g (s)		15.0	15.0	10.0	29.0		5.9		5.9			
Actuated g/C Ratio		0.35	0.35	0.23	0.68		0.14		0.14			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		651	553	413	1259		243		218			
v/s Ratio Prot		c0.23		c0.17	0.33		c0.07					
v/s Ratio Perm			0.02						0.01			
v/c Ratio		0.65	0.05	0.74	0.49		0.51		0.08			
Uniform Delay, d1		11.8	9.2	15.2	3.4		17.2		16.1			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		2.4	0.0	5.9	0.3		0.8		0.1			
Delay (s)		14.1	9.3	21.1	3.7		17.9		16.2			
Level of Service		B	A	C	A		B		B			
Approach Delay (s)		13.3			9.4			17.1			0.0	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM Average Control Delay			11.7			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			42.9			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			52.5%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

South Sutter
 Existing Conditions - AM Peak



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)	31	577	0	0	694	6	0	0	0	25	0	120
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)	34	627	0	0	754	7	0	0	0	27	0	130
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	761			627			1583	1455	627	1452	1452	758
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	761			627			1583	1455	627	1452	1452	758
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 %	96			100			100	100	100	74	100	68
cM capacity (veh/h)	851			955			58	125	483	105	125	407
Direction, Lane #	EB 1	WB 1	SB 1	SB 2								
Volume Total	661	761	27	130								
Volume Left	34	0	27	0								
Volume Right	0	7	0	130								
cSH	851	1700	105	407								
Volume to Capacity	0.04	0.45	0.26	0.32								
Queue Length 95th (ft)	3	0	24	34								
Control Delay (s)	1.0	0.0	50.8	18.0								
Lane LOS	A		F	C								
Approach Delay (s)	1.0	0.0	23.6									
Approach LOS			C									
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			65.7%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Powerline Rd

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	2	7	1	5	0	12	0	5	0	4	3
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Hourly flow rate (vph)	4	4	14	2	10	0	24	0	10	0	8	6
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	69	69	11	80	67	5	14			10		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	69	69	11	80	67	5	14			10		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	99	100	99			100		
cM capacity (veh/h)	904	809	1070	883	811	1078	1604			1610		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	22	12	34	14								
Volume Left	4	2	24	0								
Volume Right	14	0	10	6								
cSH	980	822	1604	1610								
Volume to Capacity	0.02	0.01	0.01	0.00								
Queue Length 95th (ft)	2	1	1	0								
Control Delay (s)	8.8	9.4	5.2	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	8.8	9.4	5.2	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			5.9									
Intersection Capacity Utilization			17.6%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
2: Sankey Rd & SR-99

South Sutter
Existing Conditions - PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↖	↗	↖	↖	↗	↖	↖	↗
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	3	1	3	11	4	61	0	1909	13	19	952	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	1	3	12	4	64	0	2009	14	20	1002	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		1			1							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2049	3052	501	2551	3052	1005	1002			2009		
vC1, stage 1 conf vol	1042	1042		2009	2009							
vC2, stage 2 conf vol	1007	2009		542	1042							
vCu, unblocked vol	2049	3052	501	2551	3052	1005	1002			2009		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	98	99	77	94	73	100			93		
cM capacity (veh/h)	96	62	515	51	72	240	687			281		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	4	3	12	4	64	0	1005	1005	14	20	501	501
Volume Left	3	0	12	0	0	0	0	0	0	20	0	0
Volume Right	0	3	0	0	64	0	0	0	14	0	0	0
cSH	84	515	51	72	240	1700	1700	1700	1700	281	1700	1700
Volume to Capacity	0.05	0.01	0.23	0.06	0.27	0.00	0.59	0.59	0.01	0.07	0.29	0.29
Queue Length 95th (ft)	4	0	19	5	26	0	0	0	0	6	0	0
Control Delay (s)	50.1	12.0	95.1	57.7	25.4	0.0	0.0	0.0	0.0	18.8	0.0	0.0
Lane LOS	F	B	F	F	D					C		
Approach Delay (s)	33.8		37.2			0.0				0.4		
Approach LOS	D		E									

Intersection Summary

Average Delay		1.1										
Intersection Capacity Utilization		69.9%		ICU Level of Service						C		
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
 3: Sankey Rd & Pacific Ave

South Sutter
 Existing Conditions - PM Peak



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↷			↶	↶	↷
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	23	10	2	36	40	63
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	27	12	2	42	47	73
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			38		79	33
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		79	33
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	93
cM capacity (veh/h)			1572		922	1041

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	38	44	120
Volume Left	0	2	47
Volume Right	12	0	73
cSH	1700	1572	991
Volume to Capacity	0.02	0.00	0.12
Queue Length 95th (ft)	0	0	10
Control Delay (s)	0.0	0.4	9.1
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	9.1
Approach LOS			A

Intersection Summary			
Average Delay		5.5	
Intersection Capacity Utilization	16.3%		ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 4: Riego Rd & Powerline Rd

South Sutter
 Existing Conditions - PM Peak
























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	13	0	1	14	12	4	5	12	8	4	0
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	0	16	0	1	17	14	5	6	14	10	5	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	16	33	25	14
Volume Left (vph)	0	1	5	10
Volume Right (vph)	0	14	14	0
Hadj (s)	0.03	-0.23	-0.27	0.17
Departure Headway (s)	4.0	3.8	3.7	4.2
Degree Utilization, x	0.02	0.03	0.03	0.02
Capacity (veh/h)	874	939	936	844
Control Delay (s)	7.1	6.9	6.8	7.3
Approach Delay (s)	7.1	6.9	6.8	7.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay		7.0	
HCM Level of Service		A	
Intersection Capacity Utilization	13.3%		ICU Level of Service A
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & SR-99

South Sutter
Existing Conditions - PM Peak

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.94		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1732		1681	1654		1770	3343	1583	1770	3223	1583
Flt Permitted		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1732		1681	1654		1770	3343	1583	1770	3223	1583
Volume (vph)	3	10	12	286	10	33	22	1886	567	51	913	2
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	10	12	295	10	34	23	1944	585	53	941	2
RTOR Reduction (vph)	0	11	0	0	6	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	14	0	174	159	0	23	1944	585	53	941	2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	12%	2%
Turn Type	Split		Split		Prot		Free		Prot		Free	
Protected Phases	7	7		8	8		5	2		1	6	
Permitted Phases									Free			Free
Actuated Green, G (s)		4.5		15.6	15.6		3.9	75.7	125.3	6.9	78.7	125.3
Effective Green, g (s)		6.5		17.6	17.6		3.4	78.8	125.3	6.4	81.8	125.3
Actuated g/C Ratio		0.05		0.14	0.14		0.03	0.63	1.00	0.05	0.65	1.00
Clearance Time (s)		6.0		6.0	6.0		3.5	7.1		3.5	7.1	
Vehicle Extension (s)		1.0		1.0	1.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		90		236	232		48	2102	1583	90	2104	1583
v/s Ratio Prot		0.01		c0.10	0.10		0.01	c0.58		c0.03	0.29	
v/s Ratio Perm									c0.37			0.00
v/c Ratio		0.15		0.74	0.69		0.48	0.92	0.37	0.59	0.45	0.00
Uniform Delay, d1		56.8		51.6	51.2		60.1	20.6	0.0	58.2	10.7	0.0
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.3		9.9	6.5		2.7	7.4	0.7	6.2	0.1	0.0
Delay (s)		57.0		61.5	57.7		62.8	28.0	0.7	64.4	10.7	0.0
Level of Service		E		E	E		E	C	A	E	B	A
Approach Delay (s)		57.0			59.7			22.1			13.6	
Approach LOS		E			E			C			B	
Intersection Summary												
HCM Average Control Delay			23.4			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			125.3			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			74.7%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 6: Riego Rd & Pacific Ave

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	13	615	266	5	25	63
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	683	296	6	28	70
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	301				1011	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	301				1011	298
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				89	91
cM capacity (veh/h)	1260				263	741

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	698	301	98
Volume Left	14	0	28
Volume Right	0	6	70
cSH	1260	1700	488
Volume to Capacity	0.01	0.18	0.20
Queue Length 95th (ft)	1	0	18
Control Delay (s)	0.3	0.0	14.2
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	14.2
Approach LOS			B

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 7: Riego Rd & Natomas Rd

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	2	636	2	19	269	8	1	14	23	1	6	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	2	699	2	21	296	9	1	15	25	1	7	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	703	325	42	9
Volume Left (vph)	2	21	1	1
Volume Right (vph)	2	9	25	1
Hadj (s)	0.03	0.03	-0.32	-0.02
Departure Headway (s)	4.5	4.8	5.9	6.3
Degree Utilization, x	0.87	0.44	0.07	0.02
Capacity (veh/h)	790	721	570	524
Control Delay (s)	29.5	11.5	9.3	9.4
Approach Delay (s)	29.5	11.5	9.3	9.4
Approach LOS	D	B	A	A

Intersection Summary			
Delay		23.1	
HCM Level of Service		C	
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↗	
Sign Control		Stop	Stop		Stop	
Volume (vph)	8	648	300	74	49	9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	720	333	82	54	10
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	729	333	82	64		
Volume Left (vph)	9	0	0	54		
Volume Right (vph)	0	0	82	10		
Hadj (s)	0.04	0.03	-0.67	0.11		
Departure Headway (s)	4.7	5.4	4.6	6.5		
Degree Utilization, x	0.96	0.50	0.11	0.12		
Capacity (veh/h)	750	668	763	526		
Control Delay (s)	44.6	12.3	7.0	10.4		
Approach Delay (s)	44.6	11.3		10.4		
Approach LOS	E	B		B		
Intersection Summary						
Delay			31.3			
HCM Level of Service			D			
Intersection Capacity Utilization			50.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

South Sutter
 Existing Conditions - PM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	↘
Sign Control	Stop			Stop	Stop	
Volume (vph)	658	39	37	323	51	57
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	700	41	39	344	54	61
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	700	41	383	115		
Volume Left (vph)	0	0	39	54		
Volume Right (vph)	0	41	0	61		
Hadj (s)	0.03	-0.67	0.05	-0.19		
Departure Headway (s)	5.3	4.6	5.3	6.3		
Degree Utilization, x	1.03	0.05	0.56	0.20		
Capacity (veh/h)	670	770	671	550		
Control Delay (s)	64.2	6.7	14.9	10.8		
Approach Delay (s)	61.0		14.9	10.8		
Approach LOS	F		B	B		
Intersection Summary						
Delay			42.1			
HCM Level of Service			E			
Intersection Capacity Utilization			60.9%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	639	11	33	321	29	5	6	187	51	4	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	666	11	34	334	30	5	6	195	53	4	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	678	399	206	57
Volume Left (vph)	1	34	5	53
Volume Right (vph)	11	30	195	0
Hadj (s)	0.02	0.01	-0.53	0.22
Departure Headway (s)	5.5	5.8	6.3	7.5
Degree Utilization, x	1.04	0.64	0.36	0.12
Capacity (veh/h)	645	599	545	429
Control Delay (s)	69.7	18.8	12.8	11.6
Approach Delay (s)	69.7	18.8	12.8	11.6
Approach LOS	F	C	B	B

Intersection Summary			
Delay		43.3	
HCM Level of Service		E	
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	6	860	369	11	13	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	6	915	393	12	14	7
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	404				1326	398
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	404				1326	398
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				92	99
cM capacity (veh/h)	1154				171	651
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	921	404	21			
Volume Left	6	0	14			
Volume Right	0	12	7			
cSH	1154	1700	230			
Volume to Capacity	0.01	0.24	0.09			
Queue Length 95th (ft)	0	0	8			
Control Delay (s)	0.2	0.0	22.2			
Lane LOS	A		C			
Approach Delay (s)	0.2	0.0	22.2			
Approach LOS			C			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization		60.0%		ICU Level of Service		B
Analysis Period (min)			15			




























HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

South Sutter
 Existing Conditions - PM Peak

	→	↘	↙	←	↖	↗
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)	829	54	262	336	63	294
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	864	56	273	350	66	306
RTOR Reduction (vph)	0	13	0	0	0	82
Lane Group Flow (vph)	864	43	273	350	66	224
Turn Type		Perm	Prot			pm+ov
Protected Phases	2		1	6	4	1
Permitted Phases		2				4
Actuated Green, G (s)	46.2	46.2	16.2	66.0	4.1	20.3
Effective Green, g (s)	48.2	48.2	15.8	68.0	4.4	20.2
Actuated g/C Ratio	0.60	0.60	0.20	0.85	0.05	0.25
Clearance Time (s)	6.0	6.0	3.6	6.0	4.3	3.6
Vehicle Extension (s)	2.0	2.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)	1117	949	348	1576	97	476
v/s Ratio Prot	c0.46		c0.15	0.19	c0.04	0.09
v/s Ratio Perm		0.03				0.05
v/c Ratio	0.77	0.05	0.78	0.22	0.68	0.47
Uniform Delay, d1	12.0	6.6	30.7	1.2	37.3	25.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.0	10.2	0.0	14.5	0.3
Delay (s)	15.1	6.6	40.9	1.2	51.8	25.8
Level of Service	B	A	D	A	D	C
Approach Delay (s)	14.6			18.6	30.4	
Approach LOS	B			B	C	
Intersection Summary						
HCM Average Control Delay			19.0		HCM Level of Service	B
HCM Volume to Capacity ratio			0.77			
Actuated Cycle Length (s)			80.4		Sum of lost time (s)	12.0
Intersection Capacity Utilization			71.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt

South Sutter
 Existing Conditions - PM Peak

													
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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3494		1770	3539	1583	1770	3539	1583	1770	1863	1583	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	3494		1770	3539	1583	1770	3539	1583	1770	1863	1583	
Volume (vph)	554	682	64	246	236	152	20	455	274	43	415	333	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	
Adj. Flow (vph)	596	733	69	265	254	163	22	489	295	46	446	358	
RTOR Reduction (vph)	0	7	0	0	0	141	0	0	187	0	0	246	
Lane Group Flow (vph)	596	795	0	265	254	22	22	489	108	46	446	112	
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm	
Protected Phases	7	4		3	8		5	2		1		6	
Permitted Phases						8			2			6	
Actuated Green, G (s)	31.5	34.3		7.1	9.9	9.9	1.1	24.3	24.3	2.3	25.5	25.5	
Effective Green, g (s)	31.5	36.3		7.1	11.9	11.9	1.1	26.3	26.3	2.3	27.5	27.5	
Actuated g/C Ratio	0.36	0.41		0.08	0.14	0.14	0.01	0.30	0.30	0.03	0.31	0.31	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	
Lane Grp Cap (vph)	634	1441		143	479	214	22	1058	473	46	582	495	
v/s Ratio Prot	c0.34	c0.23		c0.15	0.07		0.01	0.14		c0.03	c0.24		
v/s Ratio Perm						0.01			0.07			0.07	
v/c Ratio	0.94	0.55		1.85	0.53	0.10	1.00	0.46	0.23	1.00	0.77	0.23	
Uniform Delay, d1	27.3	19.7		40.5	35.4	33.4	43.5	25.1	23.2	42.9	27.3	22.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	22.1	0.7		409.5	1.9	0.4	191.9	0.6	0.5	132.7	6.9	0.5	
Delay (s)	49.5	20.4		450.0	37.4	33.8	235.3	25.7	23.7	175.5	34.3	22.8	
Level of Service	D	C		F	D	C	F	C	C	F	C	C	
Approach Delay (s)		32.8			196.8			30.7			37.1		
Approach LOS		C			F			C			D		
Intersection Summary													
HCM Average Control Delay			63.3									HCM Level of Service	E
HCM Volume to Capacity ratio			0.83										
Actuated Cycle Length (s)			88.0									Sum of lost time (s)	8.0
Intersection Capacity Utilization			75.7%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Powerline Rd

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	40	1	6	16	3	2	17	14	2	9	1
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	0	52	1	8	21	4	3	22	18	3	12	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	53	32	43	16
Volume Left (vph)	0	8	3	3
Volume Right (vph)	1	4	18	1
Hadj (s)	0.02	0.01	-0.21	0.02
Departure Headway (s)	4.1	4.1	3.9	4.1
Degree Utilization, x	0.06	0.04	0.05	0.02
Capacity (veh/h)	865	863	894	845
Control Delay (s)	7.3	7.2	7.1	7.2
Approach Delay (s)	7.3	7.2	7.1	7.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay		7.2	
HCM Level of Service		A	
Intersection Capacity Utilization	16.3%		ICU Level of Service A
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
15: Elverta Rd & SR-99

South Sutter
Existing Conditions - PM Peak

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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.95		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1761		1681	1612		1770	3343	1583	1770	3223	1583
Flt Permitted		0.99		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1761		1681	1612		1770	3343	1583	1770	3223	1583
Volume (vph)	11	24	17	89	9	31	12	2433	590	30	1180	1
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	11	25	18	92	9	32	12	2508	608	31	1216	1
RTOR Reduction (vph)	0	10	0	0	19	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	44	0	66	48	0	12	2508	608	31	1216	1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	12%	2%
Turn Type	Split		Split		Prot		Free		Prot		Free	
Protected Phases	7	7	8		8		5	2	1		6	
Permitted Phases									Free		Free	
Actuated Green, G (s)	7.1		9.3		9.3		2.6	112.0	156.0	5.0	114.4	156.0
Effective Green, g (s)	9.1		11.3		11.3		2.1	115.1	156.0	4.5	117.5	156.0
Actuated g/C Ratio	0.06		0.07		0.07		0.01	0.74	1.00	0.03	0.75	1.00
Clearance Time (s)	6.0		6.0		6.0		3.5	7.1		3.5	7.1	
Vehicle Extension (s)	1.0		1.0		1.0		2.2	2.0		2.2	2.0	
Lane Grp Cap (vph)	103		122		117		24	2467	1583	51	2428	1583
v/s Ratio Prot	0.02		c0.04		0.03		0.01	c0.75		0.02	0.38	
v/s Ratio Perm									c0.38			0.00
v/c Ratio	0.42		0.54		0.41		0.50	1.02	0.38	0.61	0.50	0.00
Uniform Delay, d1	70.9		69.8		69.2		76.4	20.5	0.0	74.9	7.6	0.0
Progression Factor	1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0		2.6		0.9		8.1	22.4	0.7	14.4	0.7	0.0
Delay (s)	71.9		72.5		70.1		84.5	42.8	0.7	89.2	8.4	0.0
Level of Service	E		E		E		F	D	A	F	A	A
Approach Delay (s)	71.9				71.2		34.8				10.4	
Approach LOS	E				E		C				B	
Intersection Summary												
HCM Average Control Delay			29.6		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			156.0		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			83.6%		ICU Level of Service				E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	632	2	23	120	2	5	34	97	3	18	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	702	2	26	133	2	6	38	108	3	20	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	716	161	151	28
Volume Left (vph)	11	26	6	3
Volume Right (vph)	2	2	108	4
Hadj (s)	0.04	0.06	-0.39	-0.04
Departure Headway (s)	4.7	5.4	5.7	6.4
Degree Utilization, x	0.94	0.24	0.24	0.05
Capacity (veh/h)	753	644	608	530
Control Delay (s)	40.4	10.1	10.5	9.7
Approach Delay (s)	40.4	10.1	10.5	9.7
Approach LOS	E	B	B	A

Intersection Summary			
Delay		30.7	
HCM Level of Service		D	
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

South Sutter
 Existing Conditions - PM Peak



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)	62	670	0	2	137	1	0	0	0	4	0	8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	69	744	0	2	152	1	0	0	0	4	0	9
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	153			744			1048	1040	744	1039	1039	153
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	153			744			1048	1040	744	1039	1039	153
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			100	100	100	98	100	99
cM capacity (veh/h)	1427			863			196	219	414	200	219	893

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	813	2	153	0	13
Volume Left	69	2	0	0	4
Volume Right	0	0	1	0	9
cSH	1427	863	1700	1700	415
Volume to Capacity	0.05	0.00	0.09	0.00	0.03
Queue Length 95th (ft)	4	0	0	0	2
Control Delay (s)	1.2	9.2	0.0	0.0	14.0
Lane LOS	A	A		A	B
Approach Delay (s)	1.2	0.1		0.0	14.0
Approach LOS				A	B

Intersection Summary		
Average Delay		1.2
Intersection Capacity Utilization	59.3%	ICU Level of Service B
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

South Sutter
 Existing Conditions - PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	7	571	278	10	6	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	601	293	11	6	2
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	303				914	298
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	303				914	298
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	100
cM capacity (veh/h)	1258				302	742

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	608	303	8
Volume Left	7	0	6
Volume Right	0	11	2
cSH	1258	1700	354
Volume to Capacity	0.01	0.18	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.2	0.0	15.4
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	15.4
Approach LOS			C

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

South Sutter
 Existing Conditions - PM Peak



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)	9	560	5	62	274	7	8	12	81	4	3	5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	9	577	5	64	282	7	8	12	84	4	3	5
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	290			582			1019	1016	580	1102	1015	286
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	290			582			1019	1016	580	1102	1015	286
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 %	99			94			96	94	84	97	99	99
cM capacity (veh/h)	1272			992			200	221	514	143	221	753

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	592	354	104	12
Volume Left	9	64	8	4
Volume Right	5	7	84	5
cSH	1272	992	401	249
Volume to Capacity	0.01	0.06	0.26	0.05
Queue Length 95th (ft)	1	5	26	4
Control Delay (s)	0.2	2.2	17.1	20.2
Lane LOS	A	A	C	C
Approach Delay (s)	0.2	2.2	17.1	20.2
Approach LOS			C	C

Intersection Summary			
Average Delay		2.8	
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

South Sutter
Existing Conditions - PM Peak















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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	223	421	149	278	198	85	360	579	374	129	401	142
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	230	434	154	287	204	88	371	597	386	133	413	146
RTOR Reduction (vph)	0	0	114	0	0	64	0	0	260	0	0	109
Lane Group Flow (vph)	230	434	40	287	204	24	371	597	126	133	413	37
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	9.0	20.4	20.4	10.1	21.8	21.8	11.6	25.9	25.9	5.6	19.9	19.9
Effective Green, g (s)	10.5	22.1	22.1	11.6	23.2	23.2	13.1	27.6	27.6	7.1	21.6	21.6
Actuated g/C Ratio	0.12	0.26	0.26	0.14	0.27	0.27	0.16	0.33	0.33	0.08	0.26	0.26
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	427	927	415	472	973	435	533	1663	518	289	1301	405
v/s Ratio Prot	0.07	c0.12		c0.08	0.06		c0.11	c0.12		0.04	0.08	
v/s Ratio Perm			0.03			0.02			0.08			0.02
v/c Ratio	0.54	0.47	0.10	0.61	0.21	0.06	0.70	0.36	0.24	0.46	0.32	0.09
Uniform Delay, d1	34.7	26.2	23.6	34.3	23.5	22.5	33.8	21.7	20.8	36.8	25.4	23.9
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	0.7	1.0	0.3	1.5	0.2	0.1	3.2	0.3	0.6	0.4	0.3	0.2
Delay (s)	35.3	27.2	23.9	35.8	23.8	22.6	37.0	22.0	21.4	37.2	25.8	24.2
Level of Service	D	C	C	D	C	C	D	C	C	D	C	C
Approach Delay (s)		28.9			29.6			25.9			27.6	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	84.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			













HCM Unsignalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

South Sutter
 Existing Conditions - PM Peak

												
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	7	6	0	13	356	0	0	0	90	0	2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	8	7	0	15	419	0	0	0	106	0	2
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	15			8			26	24	8	24	24	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	15			8			26	24	8	24	24	15
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			100			100	100	100	89	100	100
cM capacity (veh/h)	1602			1612			982	870	1074	988	870	1064
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2						
Volume Total	8	7	15	419	106	2						
Volume Left	0	0	0	0	106	0						
Volume Right	0	7	0	419	0	2						
cSH	1700	1700	1700	1700	988	1064						
Volume to Capacity	0.00	0.00	0.01	0.25	0.11	0.00						
Queue Length 95th (ft)	0	0	0	0	9	0						
Control Delay (s)	0.0	0.0	0.0	0.0	9.1	8.4						
Lane LOS					A	A						
Approach Delay (s)	0.0		0.0		9.1							
Approach LOS					A							
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			25.4%		ICU Level of Service		A					
Analysis Period (min)			15									













HCM Unsignalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

South Sutter
 Existing Conditions - PM Peak

												
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	94	3	0	350	118	19	0	1062	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	102	3	0	380	128	21	0	1154	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)												
pX, platoon unblocked												
vC, conflicting volume	380			102			483	483	102	1637	483	380
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	380			102			483	483	102	1637	483	380
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			100			96	100	0	0	100	100
cM capacity (veh/h)	1178			1490			494	484	953	0	484	667
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	102	3	380	128	21	1154						
Volume Left	0	0	0	0	21	0						
Volume Right	0	3	0	128	0	1154						
cSH	1700	1700	1700	1700	494	953						
Volume to Capacity	0.06	0.00	0.22	0.08	0.04	1.21						
Queue Length 95th (ft)	0	0	0	0	3	923						
Control Delay (s)	0.0	0.0	0.0	0.0	12.6	122.1						
Lane LOS					B	F						
Approach Delay (s)	0.0		0.0		120.2							
Approach LOS					F							
Intersection Summary												
Average Delay			78.9									
Intersection Capacity Utilization			77.4%		ICU Level of Service		D					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

South Sutter
 Existing Conditions - PM Peak

												
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	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)	0	610	65	142	283	0	54	0	305	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)	0	663	71	154	308	0	59	0	332	0	0	0
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	299	0	0	0
Lane Group Flow (vph)	0	663	38	154	308	0	59	0	33	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		25.7	25.7	7.3	36.5		5.5		5.5			
Effective Green, g (s)		27.2	27.2	6.8	38.0		5.0		5.0			
Actuated g/C Ratio		0.53	0.53	0.13	0.75		0.10		0.10			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		994	844	236	1388		174		155			
v/s Ratio Prot		c0.36		c0.09	0.17		c0.03					
v/s Ratio Perm			0.02						0.02			
v/c Ratio		0.67	0.05	0.65	0.22		0.34		0.21			
Uniform Delay, d1		8.6	5.7	21.0	2.0		21.5		21.2			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		1.7	0.0	4.9	0.1		0.4		0.2			
Delay (s)		10.3	5.7	25.8	2.1		21.9		21.4			
Level of Service		B	A	C	A		C		C			
Approach Delay (s)		9.9			10.0			21.5			0.0	
Approach LOS		A			A			C			A	
Intersection Summary												
HCM Average Control Delay			12.8			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			51.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			57.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

South Sutter
 Existing Conditions - PM Peak



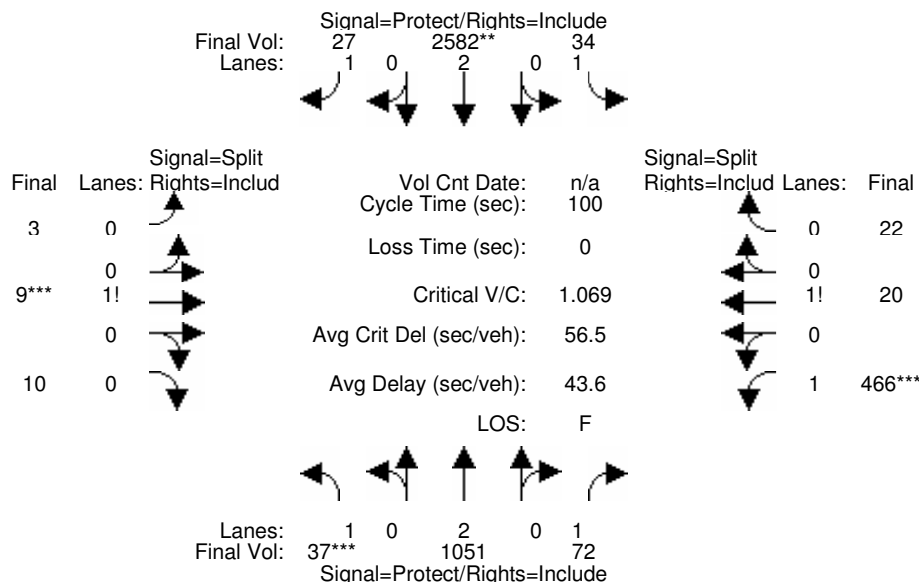
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔					↔		↔
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	121	800	0	0	431	30	0	0	0	11	0	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	870	0	0	468	33	0	0	0	12	0	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	501			870			1661	1634	870	1617	1617	485
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	501			870			1661	1634	870	1617	1617	485
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 %	88			100			100	100	100	84	100	93
cM capacity (veh/h)	1063			775			65	89	351	75	91	582

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	1001	501	12	43
Volume Left	132	0	12	0
Volume Right	0	33	0	43
cSH	1063	1700	75	582
Volume to Capacity	0.12	0.29	0.16	0.07
Queue Length 95th (ft)	11	0	13	6
Control Delay (s)	3.1	0.0	61.7	11.7
Lane LOS	A		F	B
Approach Delay (s)	3.1	0.0	22.5	
Approach LOS			C	

Intersection Summary			
Average Delay		2.8	
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)		15	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing AM

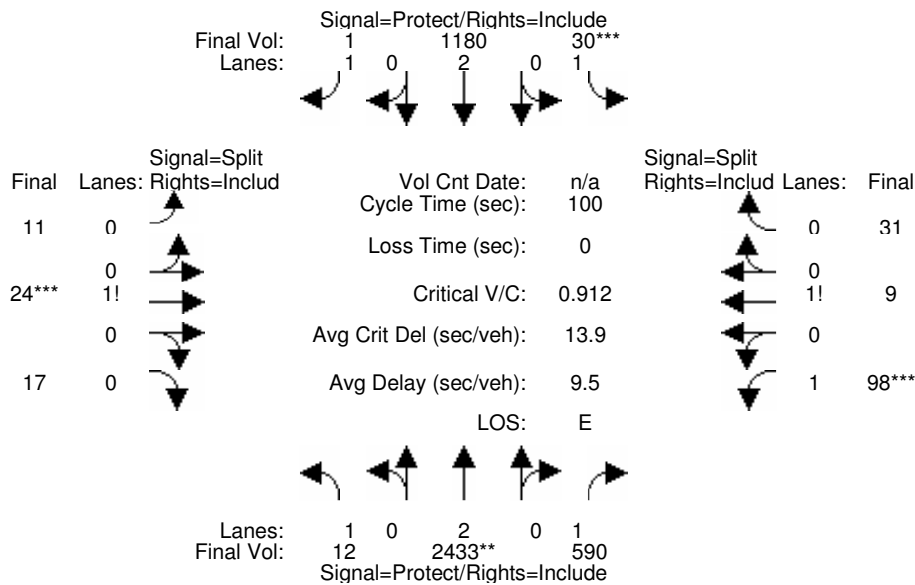
Intersection #15: Elverta Road / SR 70 / SR 99



Street Name:	SR 70 / SR 99						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	37	1051	72	34	2582	27	3	9	10	424	20	22
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	37	1051	72	34	2582	27	3	9	10	424	20	22
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	37	1051	72	34	2582	27	3	9	10	424	20	22
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	37	1051	72	34	2582	27	3	9	10	424	20	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	1051	72	34	2582	27	3	9	10	424	20	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	37	1051	72	34	2582	27	3	9	10	466	20	22
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.14	0.41	0.45	1.83	0.08	0.09
Final Sat.:	1500	3000	1500	1500	3000	1500	205	614	682	2752	118	130
Capacity Analysis Module:												
Vol/Sat:	0.02	0.35	0.05	0.02	0.86	0.02	0.01	0.01	0.01	0.17	0.17	0.17
Crit Volume:	37			1291			22			254		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing PM

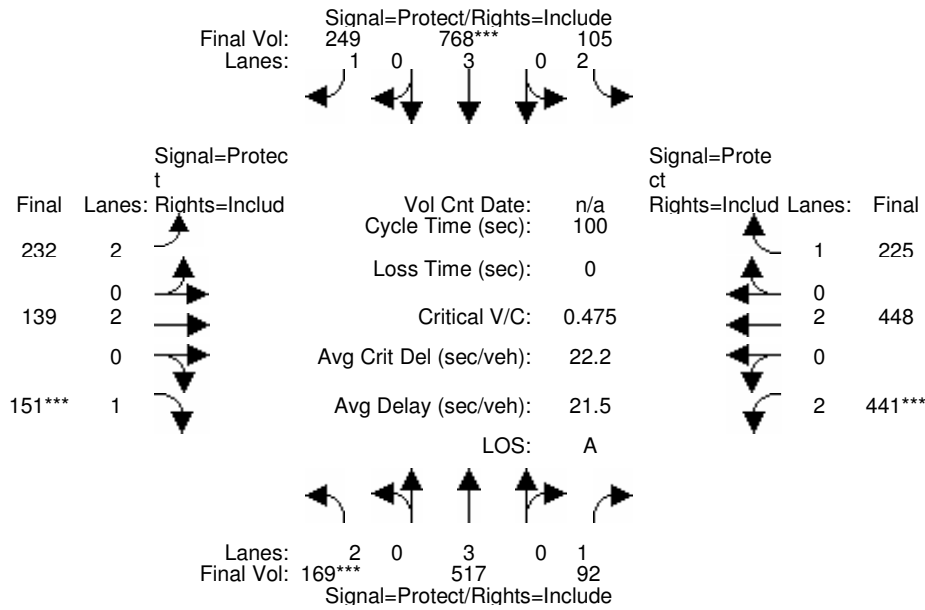
Intersection #15: Elverta Road / SR 70 / SR 99



Street Name:	SR 70 / SR 99						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	12	2433	590	30	1180	1	11	24	17	89	9	31
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	12	2433	590	30	1180	1	11	24	17	89	9	31
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	12	2433	590	30	1180	1	11	24	17	89	9	31
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	12	2433	590	30	1180	1	11	24	17	89	9	31
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	12	2433	590	30	1180	1	11	24	17	89	9	31
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	12	2433	590	30	1180	1	11	24	17	98	9	31
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.21	0.46	0.33	1.42	0.13	0.45
Final Sat.:	1500	3000	1500	1500	3000	1500	317	692	490	2130	196	674
Capacity Analysis Module:												
Vol/Sat:	0.01	0.81	0.39	0.02	0.39	0.00	0.03	0.03	0.03	0.05	0.05	0.05
Crit Volume:		1216			30			52			69	
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing AM

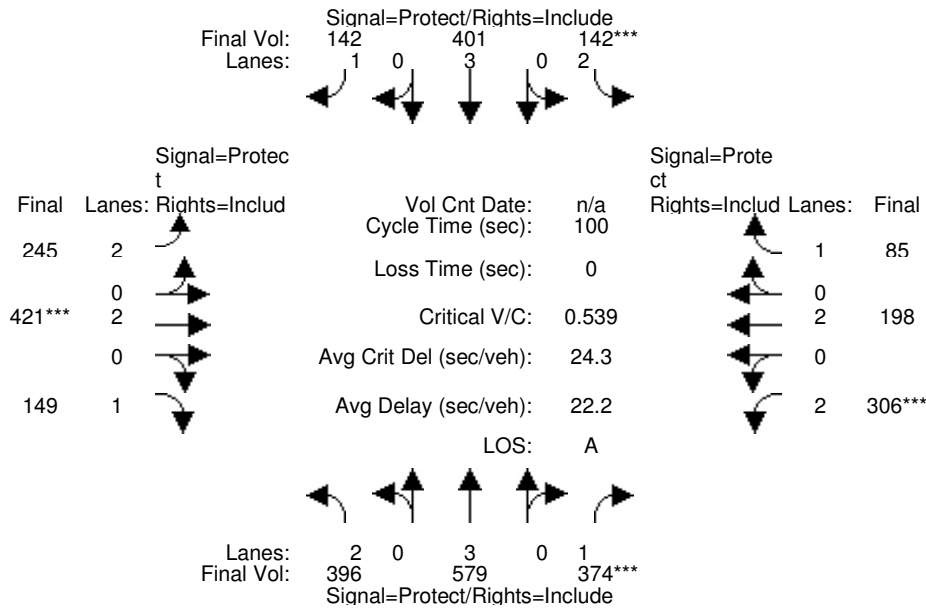
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	154	517	92	95	768	249	211	139	151	401	448	225
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	154	517	92	95	768	249	211	139	151	401	448	225
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	154	517	92	95	768	249	211	139	151	401	448	225
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	154	517	92	95	768	249	211	139	151	401	448	225
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	154	517	92	95	768	249	211	139	151	401	448	225
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	169	517	92	105	768	249	232	139	151	441	448	225
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.06	0.11	0.06	0.03	0.17	0.17	0.08	0.05	0.10	0.15	0.15	0.15
Crit Volume:	85				256				151	221		
Crit Moves:	****				****				****	****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing PM

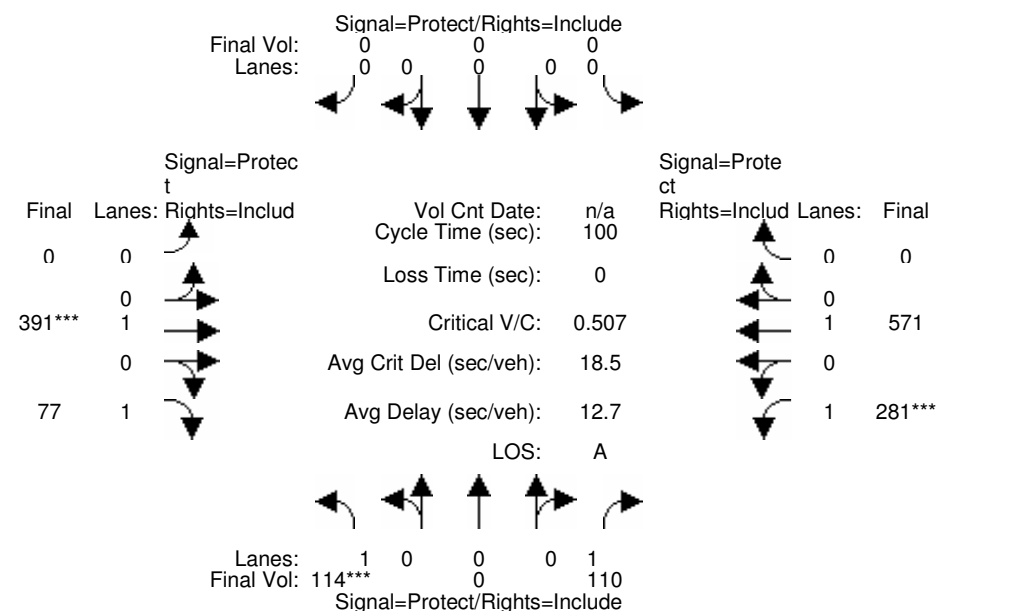
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	360	579	374	129	401	142	223	421	149	278	198	85
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	360	579	374	129	401	142	223	421	149	278	198	85
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	360	579	374	129	401	142	223	421	149	278	198	85
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	360	579	374	129	401	142	223	421	149	278	198	85
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	360	579	374	129	401	142	223	421	149	278	198	85
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	396	579	374	142	401	142	245	421	149	306	198	85
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.13	0.13	0.25	0.05	0.09	0.09	0.08	0.14	0.10	0.10	0.07	0.06
Crit Volume:			374			71			211			153
Crit Moves:			****			****			****			****

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing AM

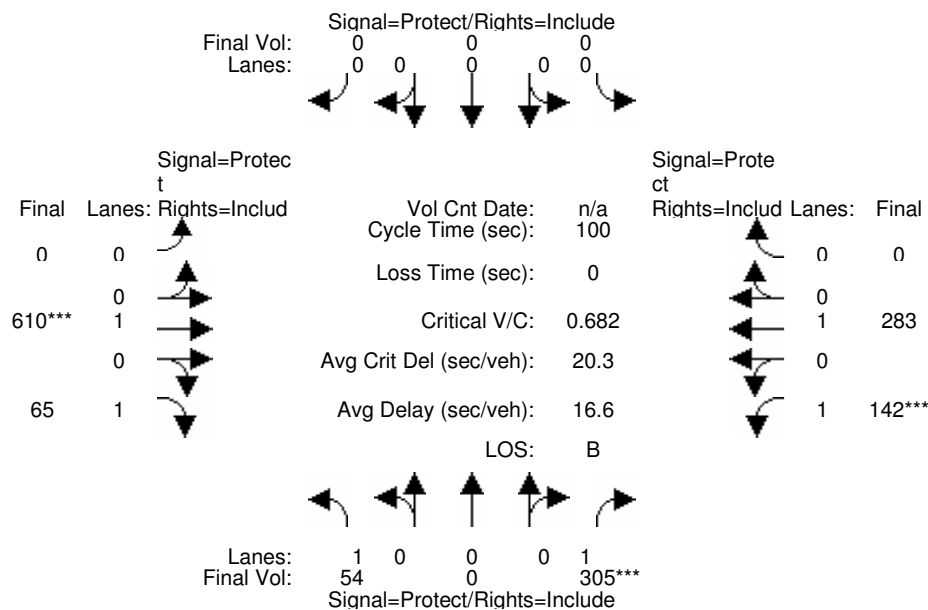
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	114	0	110	0	0	0	0	391	77	281	571	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	114	0	110	0	0	0	0	391	77	281	571	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	114	0	110	0	0	0	0	391	77	281	571	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	114	0	110	0	0	0	0	391	77	281	571	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	114	0	110	0	0	0	0	391	77	281	571	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	114	0	110	0	0	0	0	391	77	281	571	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	1550	1550	0
Capacity Analysis Module:												
Vol/Sat:	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.25	0.05	0.18	0.37	0.00
Crit Volume:	114							391		281		
Crit Moves:	****							****		****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing PM

Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	54	0	305	0	0	0	0	610	65	142	283	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	54	0	305	0	0	0	0	610	65	142	283	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	54	0	305	0	0	0	0	610	65	142	283	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	54	0	305	0	0	0	0	610	65	142	283	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	54	0	305	0	0	0	0	610	65	142	283	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	54	0	305	0	0	0	0	610	65	142	283	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	1550	1550	0
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.20	0.00	0.00	0.00	0.00	0.39	0.04	0.09	0.18	0.00
Crit Volume:			305	0			610		142			
Crit Moves:			***				***		***			

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 2975 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 195 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2975	195	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	808	53	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3638	217	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 2121$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 3855 7050 No
FO
 $v v = 1517$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2121	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.343
S
Space mean speed in ramp influence area, S = 57.1 mph
R
Space mean speed in outer lanes, S = 61.3 mph
O
Space mean speed for all vehicles, S = 58.7 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 19.9 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3170 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 861 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1292 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1292 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.9 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2113 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 574 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1292 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1292 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.0 mi/h
 Number of lanes, N 2
 Density, D 27.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2922 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 794 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1787 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1787 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 21.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: Airport Blvd to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2464 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 670 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1393 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1393 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.0 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2191 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 595 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1238 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1238 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 62.4 mi/h
 Number of lanes, N 3
 Density, D 31.1 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Del Paso Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5147 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1399 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1939 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1939 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 5147 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 438 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5147	438	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1399	119	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 5818 488 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 2812$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5818	9400	No
Fi F			
$v = v - v$	5330	9400	No
FO F R			
v	488	2100	No
R			
$v = v$	1503 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2812	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 23.9$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.342$
S
Space mean speed in ramp influence area, $S = 57.1$ mph
R
Space mean speed in outer lanes, $S = 69.3$ mph
0
Space mean speed for all vehicles, $S = 62.9$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.5 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1330 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 361 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 813 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 813 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1330 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 280 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1330	280	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	361	76	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1626	312	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1626$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1626	4700	No
Fi F			
$v = v - v$	1314	4700	No
FO F R			
v	312	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1626	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 16.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.326$
S
Space mean speed in ramp influence area, $S = 57.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.5$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1050 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 1 vph
Length of first accel/decel lane 650 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1050	1	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	285		v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1284	1	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1284$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1285	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1284	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.303
S
Space mean speed in ramp influence area, S = 58.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1051 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 109 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1051	109	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	286	30	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1285	121	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1285$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 1406 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1285	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.292
S
Space mean speed in ramp influence area, S = 58.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.3 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 10.9 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1160 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 315 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 709 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 709 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 1.7 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 178 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 48 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 109 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 109 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 8.4 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 898 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 244 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 549 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 549 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 8.5 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 903 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 245 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 552 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 552 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2218 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 603 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1254 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1254 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 18.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2116 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 575 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1196 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1196 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 4.6 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 527 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 143 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 298 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 298 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.5 mi/h
 Number of lanes, N 2
 Density, D 26.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3016 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 820 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1705 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1705 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3016 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 116 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3016	116	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	820	32	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3409	129	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3409$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3409	4700	No
Fi F			
$v = v - v$	3280	4700	No
FO F R			
v	129	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3409	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 31.8$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.310$
S
Space mean speed in ramp influence area, $S = 57.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2900 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 860 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2900	860	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	788	234	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3278	958	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3278$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4236	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3278	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.566
S
Space mean speed in ramp influence area, S = 52.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3760 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 5 vph
Length of first accel/decel lane 600 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3760	5	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1022		v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4250	6	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4250 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4256	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4250	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.9 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.542
S
Space mean speed in ramp influence area, S = 52.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.5 mph

Average passenger-car speed, S 58.9 mi/h
 Number of lanes, N 2
 Density, D 36.1 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3765 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1023 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2128 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2128 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3765 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 809 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3765	809	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1023	220	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.990		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4256		888		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4256$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4256	4700	No
Fi F			
$v = v - v$	3368	4700	No
FO F R			
v	888	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4256	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 27.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.118$
S
Space mean speed in ramp influence area, $S = 62.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.3$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2113 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 809 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2113	809	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	574	220	v
Trucks and buses	25	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2584	888	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2584$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3472	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2584	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.252
S
Space mean speed in ramp influence area, S = 59.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 59.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2464 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 273 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2464	273	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	670	74	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.962 0.990
Driver population factor, fP 1.00 1.00
Flow rate, vp 2785 300 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2785$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2785	4700	No
Fi F			
$v = v - v$	2485	4700	No
FO F R			
v	300	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2785	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 14.7$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.065$
S
Space mean speed in ramp influence area, $S = 63.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 63.5$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1057 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 273 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1057	273	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	287	74	v
Trucks and buses	25	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1293	300	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1293$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1593	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1293	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 8.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, M = 0.145
S
Space mean speed in ramp influence area, S = 61.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 61.7 mph

Leisch Method for Weaving Analysis

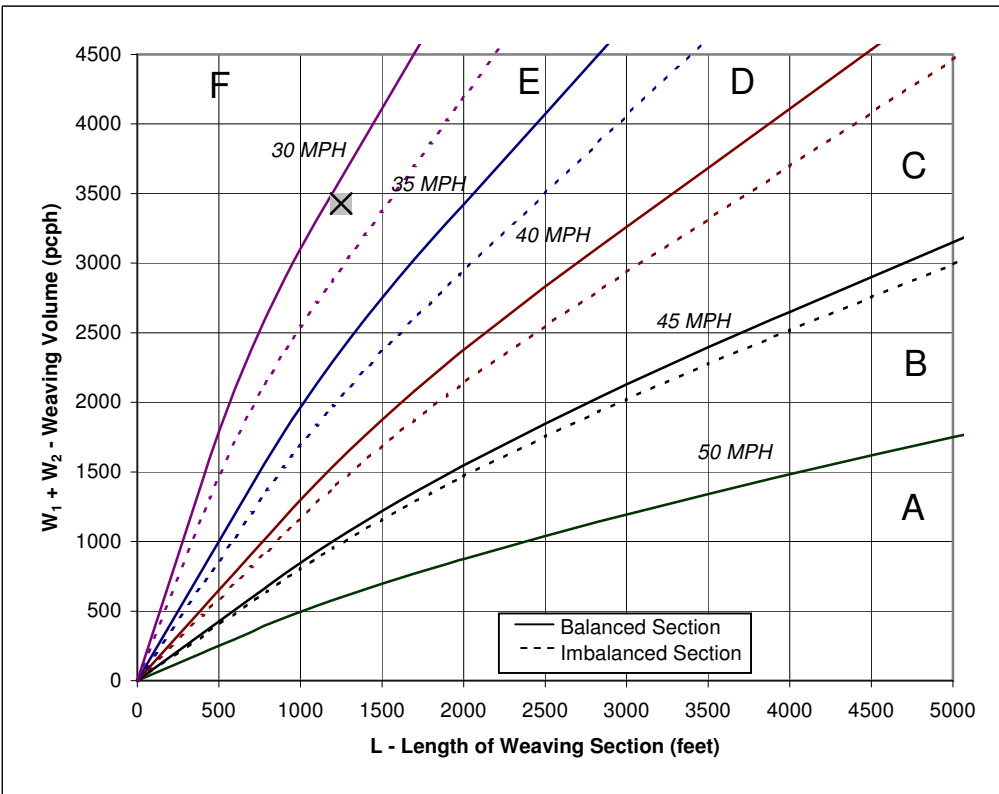
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

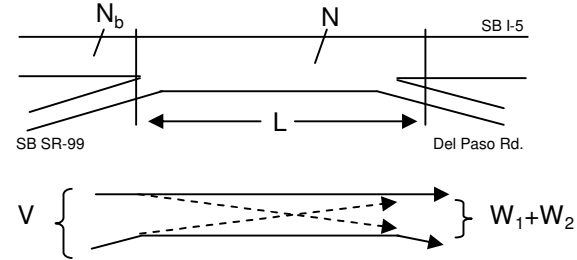
Project Information

Project	South Sutter County
Scenario	Existing - AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,147	Volume (vph)*	2,956	Volume (vph)*	438
Truck Percentage	8%	Truck Percentage	2%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,353	Volume (pcph)	2,986	Volume (pcph)	442



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **27.5**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **1,559**
- Level of Service (LOS) **E**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	3170	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	3170	1057
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.8889
----------	--------

v_f	3876.359	pc/hr/ln
-------	----------	----------

Density, D	14.1	pc/mi/ln
------------	------	----------

LOS	B
-----	---

*LOS E or *** should be confirmed vs. capacity

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

Project Information

Project:	Sutter Pointe EIR
Scenario:	Existing AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E_T	1.5	2.5	4.5
E_R	1.2	2.0	4.0

Factor	
f_P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:
 Outputs:
 Reference:

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 5380 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 305 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5380	305	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1387	79	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5768	322	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
v = v (P) = 3363 pc/h
12 F FM

Capacity Checks

v Actual Maximum LOS F?
FO 6090 7050 No
v v 2405 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3363	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 32.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.458
S
Space mean speed in ramp influence area, S = 54.5 mph
R
Space mean speed in outer lanes, S = 57.8 mph
O
Space mean speed for all vehicles, S = 55.7 mph

Average passenger-car speed, S 60.9 mi/h
 Number of lanes, N 3
 Density, D 33.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5685 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1465 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2032 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2032 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.0 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2309 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 595 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1238 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1238 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 22.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2701 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 696 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1448 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1448 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.9 mi/h
 Number of lanes, N 2
 Density, D 24.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2884 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 743 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1576 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1576 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.0 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2265 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 584 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1238 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1238 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 19.2 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Del Paso Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3429 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 884 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1249 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1249 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 3429 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 307 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3429	307	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	884	79	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 3747 324 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 1816$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3747	9400	No
Fi F			
$v = v - v$	3423	9400	No
FO F R			
v	324	2100	No
R			
$v = v$	965 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1816	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 15.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.327$
S
Space mean speed in ramp influence area, $S = 57.5$ mph
R
Space mean speed in outer lanes, $S = 71.3$ mph
0
Space mean speed for all vehicles, $S = 63.9$ mph

Average passenger-car speed, S 58.5 mi/h
 Number of lanes, N 2
 Density, D 36.6 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3995 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1030 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2142 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2142 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3995 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1081 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3995	1081	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1030	279	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4283	1142	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4283$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4283	4700	No
Fi F			
$v = v - v$	3141	4700	No
FO F R			
v	1142	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4283	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 39.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.401$
S
Space mean speed in ramp influence area, $S = 55.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2914 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 3 vph
Length of first accel/decel lane 650 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2914	3	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	751	1	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3124	3	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3124$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3127	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3124	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.377
S
Space mean speed in ramp influence area, S = 56.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 56.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2917 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 118 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2917	118	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	752	30	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3128	125	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3128$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3253	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?			No
3 or av34			
Is $v v > 1.5 v / 2$			No
3 or av34	12		
If yes, v =			(Equation 25-8)
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3128	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 27.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.377
S
Space mean speed in ramp influence area, S = 56.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 56.3 mph

Average passenger-car speed, S 64.8 mi/h
 Number of lanes, N 2
 Density, D 25.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3035 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 782 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1627 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1627 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 4.6 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 553 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 143 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 296 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 296 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 15.8 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1922 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 495 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1030 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1030 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 16.3 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1973 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 509 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1058 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1058 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 8.2 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 973 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 251 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 532 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 532 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 8.1 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 966 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 249 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 528 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 528 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 2.1 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 245 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 63 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 134 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 134 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 10.8 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1286 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 331 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 703 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 703 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1286 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 92 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1286	92	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	331	24	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1405	97	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1405$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1405	4700	No
Fi F			
$v = v - v$	1308	4700	No
FO F R			
v	97	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1405	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 14.5$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.307$
S
Space mean speed in ramp influence area, $S = 57.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1194 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 356 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1194	356	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	308	92	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1305	376	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1305$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	1681	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v	1305	4400	No
12			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.317
S
Space mean speed in ramp influence area, S = 57.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/6/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1550 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 6 vph
Length of first accel/decel lane 600 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1550	6	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	399	2	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1694	6	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1694$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1700	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1694	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.288
S
Space mean speed in ramp influence area, S = 58.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.4 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.1 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/6/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Existing
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1556 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 401 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 850 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 850 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1556 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 392 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1556	392	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	401	101	v
Trucks and buses	12	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.990
Driver population factor, fP 1.00 1.00
Flow rate, vp 1700 408 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1700$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1700	4700	No
Fi F			
$v = v - v$	1292	4700	No
FO F R			
v	408	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1700	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 5.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, $D = 0.075$
S
Space mean speed in ramp influence area, $S = 63.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 63.3$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2309 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 392 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2309	392	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	595	101	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2476	408	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2476$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2884	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2476	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.196
S
Space mean speed in ramp influence area, S = 60.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 60.5 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2884 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 619 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2884	619	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	743	160	v
Trucks and buses	12	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.990
Driver population factor, fP 1.00 1.00
Flow rate, vp 3152 645 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3152$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3152	4700	No
Fi F			
$v = v - v$	2507	4700	No
FO F R			
v	645	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3152	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 17.9$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.096$
S
Space mean speed in ramp influence area, $S = 62.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3376 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 619 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3376	619	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	870	160	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3620	645	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3620$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4265	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3620	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 29.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.404
S
Space mean speed in ramp influence area, S = 55.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.7 mph

Leisch Method for Weaving Analysis

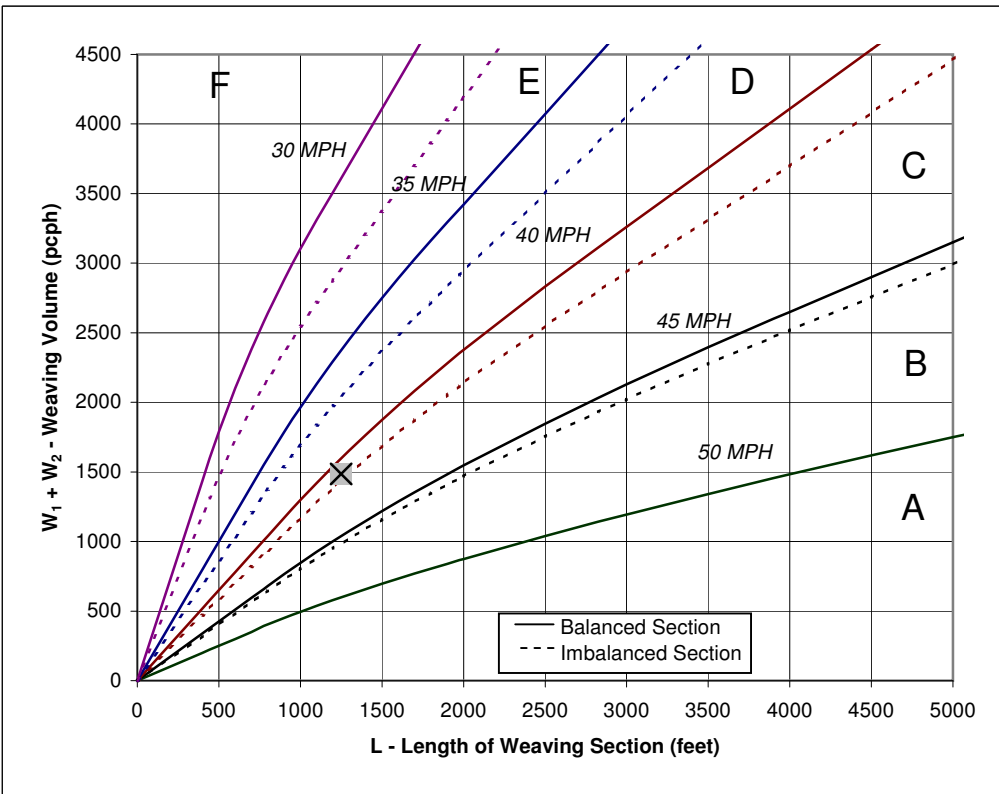
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

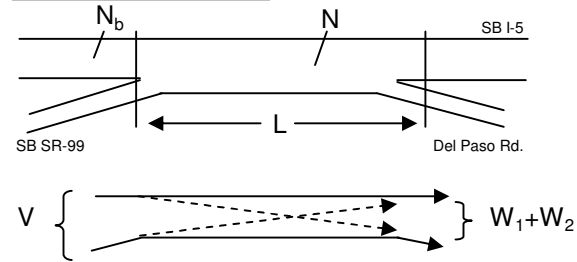
Project Information

Project	South Sutter County
Scenario	Existing - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,429	Volume (vph)*	1,164	Volume (vph)*	307
Truck Percentage	12%	Truck Percentage	2%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,635	Volume (pcph)	1,176	Volume (pcph)	310



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- 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 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **39.6**
- Weaving Intensity Factor (k) **2.65**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **1,036**
- Level of Service (LOS) **C**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	5685	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_p (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	5685	3376
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.9615
----------	--------

v_f	6095.258	pc/hr/ln
-------	----------	----------

Density, D	22.1	pc/mi/ln
------------	------	----------

LOS	C
-----	---

*LOS E or *** should be confirmed vs. capacity

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

Project Information

Project:	Sutter Pointe EIR
Scenario:	Existing PM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E_T	1.5	2.5	4.5
E_R	1.2	2.0	4.0

Factor	
f_p	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:
 Outputs:
 Reference:

**EXISTING CONDITIONS
PLUS PHASE 1 PROJECT**

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd
























Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	10	10	10	10	10	10
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)	11	11	11	11	11	11	11	11	11	11	11	11
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	92	82	16	92	82	16	22			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92	82	16	92	82	16	22			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	864	798	1063	864	798	1063	1594			1594		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	33	33	33	33								
Volume Left	11	11	11	11								
Volume Right	11	11	11	11								
cSH	895	895	1594	1594								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	1								
Control Delay (s)	9.2	9.2	2.5	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	2.5	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization			13.3%		ICU Level of Service					A		
Analysis Period (min)			15									

















HCM Unsignalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	30	10	30	10	880	20	100	2160	10
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)	11	11	11	33	11	33	11	957	22	109	2348	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	1			1								
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3071	3543	1174	2375	3543	478	2348				957	
vC1, stage 1 conf vol	2565	2565		978	978							
vC2, stage 2 conf vol	505	978		1397	2565							
vCu, unblocked vol	3071	3543	1174	2375	3543	478	2348				957	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	44	68	94	44	62	94	95				85	
cM capacity (veh/h)	19	34	185	58	28	533	206				715	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	22	11	33	11	33	11	478	478	22	109	1174	1174
Volume Left	11	0	33	0	0	11	0	0	0	109	0	0
Volume Right	0	11	0	0	33	0	0	0	22	0	0	0
cSH	25	185	58	28	533	206	1700	1700	1700	715	1700	1700
Volume to Capacity	0.87	0.06	0.56	0.38	0.06	0.05	0.28	0.28	0.01	0.15	0.69	0.69
Queue Length 95th (ft)	67	5	56	30	5	4	0	0	0	13	0	0
Control Delay (s)	361.2	25.7	126.7	195.5	12.2	23.4	0.0	0.0	0.0	10.9	0.0	0.0
Lane LOS	F	D	F	F	B	C				B		
Approach Delay (s)	249.4		87.5			0.3		0.5				
Approach LOS	F		F									
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			81.4%			ICU Level of Service		D				
Analysis Period (min)			15									

















HCM Unsignalized Intersection Capacity Analysis
 3: Sankey Rd & Road "H"

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

												
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	60	80	50	50	0	10	0	10	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	65	87	54	54	0	11	0	11	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)												
pX, platoon unblocked												
vC, conflicting volume	54			152			272	272	109	283	315	54
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	54			152			272	272	109	283	315	54
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			98	100	99	100	100	100
cM capacity (veh/h)	1551			1429			661	611	945	643	578	1013
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	152	109	11	11								
Volume Left	0	54	11	0								
Volume Right	87	0	0	11								
cSH	1700	1429	661	945								
Volume to Capacity	0.09	0.04	0.02	0.01								
Queue Length 95th (ft)	0	3	1	1								
Control Delay (s)	0.0	4.0	10.5	8.9								
Lane LOS		A	B	A								
Approach Delay (s)	0.0	4.0	9.7									
Approach LOS			A									
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			26.8%		ICU Level of Service				A			
Analysis Period (min)			15									


































HCM Unsignalized Intersection Capacity Analysis
 4: Riego Rd & Power Line Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	20	20	10	10	10	10	10	10	10	10
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)	11	22	22	22	11	11	11	11	11	11	11	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	54	43	33	33								
Volume Left (vph)	11	22	11	11								
Volume Right (vph)	22	11	11	11								
Hadj (s)	-0.17	-0.02	-0.10	-0.10								
Departure Headway (s)	3.9	4.1	4.0	4.0								
Degree Utilization, x	0.06	0.05	0.04	0.04								
Capacity (veh/h)	897	863	859	865								
Control Delay (s)	7.2	7.3	7.2	7.2								
Approach Delay (s)	7.2	7.3	7.2	7.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				7.2								
HCM Level of Service				A								
Intersection Capacity Utilization				14.8%	ICU Level of Service							A
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Pointe EIR
Existing Plus Phase 1 AM
































												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	10	260	380	1090	800	30	750	870	540	60	1970	170
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)	11	283	413	1185	870	33	815	946	587	65	2141	185
RTOR Reduction (vph)	0	0	284	0	0	24	0	0	0	0	0	0
Lane Group Flow (vph)	11	283	129	1185	870	9	815	946	587	65	2141	185
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	1.6	17.3	17.3	29.0	44.7	44.7	39.0	91.0	162.2	8.9	60.9	162.2
Effective Green, g (s)	1.6	17.3	17.3	29.0	44.7	44.7	39.0	91.0	162.2	8.9	60.9	162.2
Actuated g/C Ratio	0.01	0.11	0.11	0.18	0.28	0.28	0.24	0.56	1.00	0.05	0.38	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	34	542	169	614	1401	436	426	1620	1583	97	1255	1583
v/s Ratio Prot	0.00	0.06		c0.35	0.17		c0.46	0.33		0.04	c0.64	
v/s Ratio Perm			c0.08			0.01			0.37			0.12
v/c Ratio	0.32	0.52	0.76	1.93	0.62	0.02	1.91	0.58	0.37	0.67	1.71	0.12
Uniform Delay, d1	79.8	68.5	70.5	66.6	51.3	42.8	61.6	23.2	0.0	75.2	50.6	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.9	18.3	424.5	0.9	0.0	419.6	0.5	0.7	16.7	321.1	0.2
Delay (s)	85.2	69.5	88.7	491.1	52.2	42.8	481.2	23.8	0.7	91.9	371.8	0.2
Level of Service	F	E	F	F	D	D	F	C	A	F	F	A
Approach Delay (s)		80.9			301.1			176.8			335.4	
Approach LOS		F			F			F			F	

Intersection Summary		
HCM Average Control Delay	252.6	HCM Level of Service F
HCM Volume to Capacity ratio	1.69	
Actuated Cycle Length (s)	162.2	Sum of lost time (s) 16.0
Intersection Capacity Utilization	145.5%	ICU Level of Service H
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue













Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	1863	1583	3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	1863	1583	3433	1863	1583
Volume (vph)	80	550	10	10	1220	100	100	10	10	90	10	130
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)	87	598	11	11	1326	109	109	11	11	98	11	141
RTOR Reduction (vph)	0	0	5	0	0	49	0	0	11	0	0	126
Lane Group Flow (vph)	87	598	6	11	1326	60	109	11	0	98	11	15
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	2.6	36.4	36.4	0.8	34.6	34.6	2.6	2.1	2.1	7.2	6.7	6.7
Effective Green, g (s)	2.6	36.4	36.4	0.8	34.6	34.6	2.6	2.1	2.1	7.2	6.7	6.7
Actuated g/C Ratio	0.04	0.58	0.58	0.01	0.55	0.55	0.04	0.03	0.03	0.12	0.11	0.11
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)	143	2962	922	44	2815	876	143	63	53	395	200	170
v/s Ratio Prot	c0.03	0.12		0.00	c0.26		c0.03	0.01		c0.03	0.01	
v/s Ratio Perm			0.00			0.04			0.00			c0.01
v/c Ratio	0.61	0.20	0.01	0.25	0.47	0.07	0.76	0.17	0.01	0.25	0.06	0.09
Uniform Delay, d1	29.4	6.2	5.5	30.6	8.4	6.5	29.6	29.4	29.2	25.2	25.1	25.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.1	0.0	0.0	3.0	0.1	0.0	21.0	1.3	0.1	0.3	0.1	0.2
Delay (s)	36.6	6.2	5.5	33.5	8.5	6.5	50.7	30.7	29.2	25.5	25.2	25.4
Level of Service	D	A	A	C	A	A	D	C	C	C	C	C
Approach Delay (s)		10.0			8.6			47.2			25.4	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	62.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
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		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1583	1770	3539		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1583	1770	3539		1770		1583			
Volume (vph)	0	480	10	40	810	0	60	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)	0	522	11	43	880	0	65	0	22	0	0	0
RTOR Reduction (vph)	0	0	7	0	0	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	522	4	43	880	0	65	0	5	0	0	0
Turn Type			Perm	Prot			custom		custom			
Protected Phases		4		3	8							
Permitted Phases			4				2		2			
Actuated Green, G (s)		11.8	11.8	1.6	17.4		6.9		6.9			
Effective Green, g (s)		11.8	11.8	1.6	17.4		6.9		6.9			
Actuated g/C Ratio		0.37	0.37	0.05	0.54		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)		1293	578	88	1906		378		338			
v/s Ratio Prot		0.15		0.02	c0.25							
v/s Ratio Perm			0.00				c0.04		0.00			
v/c Ratio		0.40	0.01	0.49	0.46		0.17		0.01			
Uniform Delay, d1		7.6	6.5	15.0	4.6		10.4		10.0			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.2	0.0	4.2	0.2		0.2		0.0			
Delay (s)		7.8	6.5	19.2	4.8		10.6		10.0			
Level of Service		A	A	B	A		B		B			
Approach Delay (s)		7.8			5.4			10.4			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay			6.5				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			32.3				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			32.4%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↗	↗
Sign Control		Stop	Stop		Stop	
Volume (vph)	10	490	820	80	70	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	533	891	87	76	33
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	543	891	87	109		
Volume Left (vph)	11	0	0	76		
Volume Right (vph)	0	0	87	33		
Hadj (s)	0.04	0.03	-0.67	-0.01		
Departure Headway (s)	5.3	5.5	4.8	6.7		
Degree Utilization, x	0.80	1.35	0.12	0.20		
Capacity (veh/h)	670	669	745	512		
Control Delay (s)	25.7	185.4	7.2	11.4		
Approach Delay (s)	25.7	169.6		11.4		
Approach LOS	D	F		B		
Intersection Summary						
Delay			111.1			
HCM Level of Service			F			
Intersection Capacity Utilization			55.5%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	↘
Sign Control	Stop			Stop	Stop	
Volume (vph)	450	110	60	800	100	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	489	120	65	870	109	22
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	489	120	935	130		
Volume Left (vph)	0	0	65	109		
Volume Right (vph)	0	120	0	22		
Hadj (s)	0.03	-0.67	0.05	0.10		
Departure Headway (s)	5.7	5.0	5.3	6.8		
Degree Utilization, x	0.77	0.16	1.37	0.25		
Capacity (veh/h)	624	712	693	505		
Control Delay (s)	23.8	7.7	191.7	12.1		
Approach Delay (s)	20.6		191.7	12.1		
Approach LOS	C		F	B		
Intersection Summary						
Delay			115.5			
HCM Level of Service			F			
Intersection Capacity Utilization			85.9%	ICU Level of Service	E	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	450	10	90	840	40	10	10	40	30	10	10
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)	11	489	11	98	913	43	11	11	43	33	11	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	511	1054	65	54
Volume Left (vph)	11	98	11	33
Volume Right (vph)	11	43	43	11
Hadj (s)	0.03	0.03	-0.33	0.03
Departure Headway (s)	5.2	5.0	6.6	7.0
Degree Utilization, x	0.74	1.48	0.12	0.11
Capacity (veh/h)	675	715	508	474
Control Delay (s)	21.7	237.0	10.4	10.8
Approach Delay (s)	21.7	237.0	10.4	10.8
Approach LOS	C	F	B	B

Intersection Summary			
Delay		155.6	
HCM Level of Service		F	
Intersection Capacity Utilization	94.2%		ICU Level of Service F
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	480	950	10	20	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	522	1033	11	22	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	1043				1582	1038
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1043				1582	1038
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				82	96
cM capacity (veh/h)	667				118	280
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	533	1043	33			
Volume Left	11	0	22			
Volume Right	0	11	11			
cSH	667	1700	146			
Volume to Capacity	0.02	0.61	0.22			
Queue Length 95th (ft)	1	0	20			
Control Delay (s)	0.5	0.0	36.6			
Lane LOS	A		E			
Approach Delay (s)	0.5	0.0	36.6			
Approach LOS			E			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization		60.6%		ICU Level of Service		B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

	→	↘	↙	←	↖	↗
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)	400	100	440	840	200	230
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	435	109	478	913	217	250
RTOR Reduction (vph)	0	72	0	0	0	130
Lane Group Flow (vph)	435	37	478	913	217	120
Turn Type		Perm	Prot			pm+ov
Protected Phases	2		1	6	4	1
Permitted Phases		2				4
Actuated Green, G (s)	20.5	20.5	22.5	46.6	9.2	31.7
Effective Green, g (s)	22.5	22.5	22.1	48.6	9.5	31.6
Actuated g/C Ratio	0.34	0.34	0.33	0.74	0.14	0.48
Clearance Time (s)	6.0	6.0	3.6	6.0	4.3	3.6
Vehicle Extension (s)	2.0	2.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)	634	539	592	1370	254	853
v/s Ratio Prot	0.23		c0.27	c0.49	c0.12	0.05
v/s Ratio Perm		0.02				0.03
v/c Ratio	0.69	0.07	0.81	0.67	0.85	0.14
Uniform Delay, d1	18.8	14.7	20.1	4.5	27.6	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.0	7.5	1.0	22.6	0.0
Delay (s)	21.2	14.7	27.6	5.5	50.2	9.7
Level of Service	C	B	C	A	D	A
Approach Delay (s)	19.9			13.1	28.5	
Approach LOS	B			B	C	
Intersection Summary						
HCM Average Control Delay			17.6		HCM Level of Service	B
HCM Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			66.1		Sum of lost time (s)	8.0
Intersection Capacity Utilization			66.5%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

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
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3451		1770	3539	1583	1770	3539	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3451		1770	3539	1583	1770	3539	1583	1770	1863	1583
Volume (vph)	300	200	40	270	590	70	10	510	280	40	390	640
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)	326	217	43	293	641	76	11	554	304	43	424	696
RTOR Reduction (vph)	0	13	0	0	0	55	0	0	206	0	0	288
Lane Group Flow (vph)	326	247	0	293	641	21	11	554	98	43	424	408
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases						8			2			6
Actuated Green, G (s)	22.8	28.4		21.2	26.8	26.8	0.5	31.5	31.5	3.1	34.1	34.1
Effective Green, g (s)	22.8	30.4		21.2	28.8	28.8	0.5	33.5	33.5	3.1	36.1	36.1
Actuated g/C Ratio	0.22	0.29		0.20	0.28	0.28	0.00	0.32	0.32	0.03	0.35	0.35
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	387	1007		360	978	438	8	1138	509	53	645	548
v/s Ratio Prot	c0.18	0.07		0.17	c0.18		0.01	0.16		c0.02	0.23	
v/s Ratio Perm						0.01			0.06			c0.26
v/c Ratio	0.84	0.24		0.81	0.66	0.05	1.38	0.49	0.19	0.81	0.66	0.75
Uniform Delay, d1	39.0	28.1		39.6	33.3	27.6	51.9	28.4	25.6	50.3	28.8	30.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.2	0.2		12.5	2.1	0.1	466.9	0.6	0.4	57.4	3.1	6.4
Delay (s)	54.2	28.4		52.1	35.4	27.7	518.8	29.1	25.9	107.6	31.9	36.4
Level of Service	D	C		D	D	C	F	C	C	F	C	D
Approach Delay (s)		42.8			39.7			34.2			37.4	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay	38.1		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	104.2				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	70.1%		ICU Level of Service				C					
Analysis Period (min)	15											
c Critical Lane Group												






















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	10	30	60	10	10	10	10	10	40	10
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)	11	22	11	33	65	11	11	11	11	11	43	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	43	109	33	65								
Volume Left (vph)	11	33	11	11								
Volume Right (vph)	11	11	11	11								
Hadj (s)	-0.07	0.03	-0.10	-0.03								
Departure Headway (s)	4.2	4.2	4.2	4.2								
Degree Utilization, x	0.05	0.13	0.04	0.08								
Capacity (veh/h)	836	835	814	816								
Control Delay (s)	7.4	7.8	7.4	7.6								
Approach Delay (s)	7.4	7.8	7.4	7.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				7.6								
HCM Level of Service				A								
Intersection Capacity Utilization				18.1%	ICU Level of Service							A
Analysis Period (min)				15								

















HCM Signalized Intersection Capacity Analysis
 15: Elverta Rd & Hwy 99

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1716		1681	1611		1770	2888	1583	1770	3343	1583
Flt Permitted		0.99		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1716		1681	1611		1770	2888	1583	1770	3343	1583
Volume (vph)	10	10	20	430	30	140	40	1690	80	40	2670	30
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)	11	11	22	467	33	152	43	1837	87	43	2902	33
RTOR Reduction (vph)	0	21	0	0	21	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	23	0	325	306	0	43	1837	87	43	2902	33
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Split		Prot		Free		Prot		Free	
Protected Phases	4	4		8	8		5	2		1		6
Permitted Phases									Free			Free
Actuated Green, G (s)		6.4		23.0	23.0		4.0	91.1	140.5	4.0	91.1	140.5
Effective Green, g (s)		6.4		23.0	23.0		4.0	91.1	140.5	4.0	91.1	140.5
Actuated g/C Ratio		0.05		0.16	0.16		0.03	0.65	1.00	0.03	0.65	1.00
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		78		275	264		50	1873	1583	50	2168	1583
v/s Ratio Prot		c0.01		c0.19	0.19		c0.02	0.64		0.02	c0.87	
v/s Ratio Perm									0.05			0.02
v/c Ratio		0.29		1.18	1.16		0.86	0.98	0.05	0.86	1.34	0.02
Uniform Delay, d1		64.9		58.8	58.8		68.0	23.9	0.0	68.0	24.7	0.0
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.1		112.7	105.5		76.1	16.4	0.1	76.1	155.6	0.0
Delay (s)		67.0		171.5	164.2		144.1	40.2	0.1	144.1	180.3	0.0
Level of Service		E		F	F		F	D	A	F	F	A
Approach Delay (s)		67.0			167.8			40.7			177.7	
Approach LOS		E			F			D			F	
Intersection Summary												
HCM Average Control Delay			128.0			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			140.5			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			104.1%			ICU Level of Service				G		
Analysis Period (min)			15									
c	Critical Lane Group											

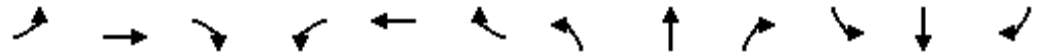
HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	110	10	120	750	50	10	30	30	10	40	20
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)	11	120	11	130	815	54	11	33	33	11	43	22
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	141	1000	76	76								
Volume Left (vph)	11	130	11	11								
Volume Right (vph)	11	54	33	22								
Hadj (s)	0.00	0.03	-0.19	-0.11								
Departure Headway (s)	5.3	4.6	6.0	6.1								
Degree Utilization, x	0.21	1.28	0.13	0.13								
Capacity (veh/h)	664	772	576	564								
Control Delay (s)	9.7	152.0	9.9	10.0								
Approach Delay (s)	9.7	152.0	9.9	10.0								
Approach LOS	A	F	A	B								
Intersection Summary												
Delay			119.7									
HCM Level of Service			F									
Intersection Capacity Utilization			67.8%		ICU Level of Service						C	
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak



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)	20	130	0	0	850	10	0	0	0	60	0	70
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)	22	141	0	0	924	11	0	0	0	65	0	76
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	935			141			1190	1120	141	1114	1114	929
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	935			141			1190	1120	141	1114	1114	929
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 %	97			100			100	100	100	64	100	77
cM capacity (veh/h)	732			1442			123	200	907	181	202	324
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	163	935	0	141								
Volume Left	22	0	0	65								
Volume Right	0	11	0	76								
cSH	732	1700	1700	238								
Volume to Capacity	0.03	0.55	0.00	0.59								
Queue Length 95th (ft)	2	0	0	86								
Control Delay (s)	1.6	0.0	0.0	40.2								
Lane LOS	A		A	E								
Approach Delay (s)	1.6	0.0	0.0	40.2								
Approach LOS			A	E								
Intersection Summary												
Average Delay			4.8									
Intersection Capacity Utilization			59.6%		ICU Level of Service					B		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	210	490	10	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	228	533	11	11	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	543				788	538
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	543				788	538
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	1025				356	543

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	239	543	22
Volume Left	11	0	11
Volume Right	0	11	11
cSH	1025	1700	430
Volume to Capacity	0.01	0.32	0.05
Queue Length 95th (ft)	1	0	4
Control Delay (s)	0.5	0.0	13.8
Lane LOS	A		B
Approach Delay (s)	0.5	0.0	13.8
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St



































Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak



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)	10	210	10	60	480	10	10	20	50	20	20	20
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)	11	228	11	65	522	11	11	22	54	22	22	22
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	533			239			946	918	234	978	918	527
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	533			239			946	918	234	978	918	527
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 %	99			95			95	91	93	89	91	96
cM capacity (veh/h)	1035			1328			207	255	805	191	255	551
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	250	598	87	65								
Volume Left	11	65	11	22								
Volume Right	11	11	54	22								
cSH	1035	1328	424	274								
Volume to Capacity	0.01	0.05	0.21	0.24								
Queue Length 95th (ft)	1	4	19	23								
Control Delay (s)	0.5	1.4	15.7	22.2								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.5	1.4	15.7	22.2								
Approach LOS			C	C								
Intersection Summary												
Average Delay			3.7									
Intersection Capacity Utilization			58.5%		ICU Level of Service				B			
Analysis Period (min)			15									













HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	220	140	170	420	450	250	160	530	100	100	770	300
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)	239	152	185	457	489	272	174	576	109	109	837	326
RTOR Reduction (vph)	0	0	72	0	0	123	0	0	68	0	0	216
Lane Group Flow (vph)	239	152	113	457	489	149	174	576	41	109	837	110
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	8.8	18.3	18.3	12.9	22.7	22.7	5.9	31.4	31.4	2.3	27.8	27.8
Effective Green, g (s)	10.3	20.0	20.0	14.4	24.1	24.1	7.4	33.1	33.1	3.8	29.5	29.5
Actuated g/C Ratio	0.12	0.23	0.23	0.16	0.28	0.28	0.08	0.38	0.38	0.04	0.34	0.34
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	405	811	363	566	977	437	291	1928	600	149	1718	535
v/s Ratio Prot	0.07	0.04		c0.13	c0.14		c0.05	c0.11		0.03	c0.16	
v/s Ratio Perm			0.07			0.09			0.03			0.07
v/c Ratio	0.59	0.19	0.31	0.81	0.50	0.34	0.60	0.30	0.07	0.73	0.49	0.21
Uniform Delay, d1	36.5	27.1	27.9	35.1	26.5	25.3	38.5	19.0	17.3	41.2	22.9	20.6
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	1.5	0.3	1.3	7.8	0.8	1.0	2.2	0.2	0.1	14.7	0.5	0.5
Delay (s)	38.0	27.4	29.3	42.9	27.4	26.2	40.7	19.2	17.4	55.9	23.4	21.0
Level of Service	D	C	C	D	C	C	D	B	B	E	C	C
Approach Delay (s)		32.4			33.0			23.3			25.6	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			28.4	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			87.3	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			51.5%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												













HCM Unsignalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

												
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	70	10	0	10	870	0	0	0	140	0	10
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	76	11	0	11	946	0	0	0	152	0	11
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	11			76			98	87	76	87	87	11
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			76			98	87	76	87	87	11
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			100			100	100	100	83	100	99
cM capacity (veh/h)	1608			1523			875	803	985	899	803	1070
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2						
Volume Total	76	11	11	946	152	11						
Volume Left	0	0	0	0	152	0						
Volume Right	0	11	0	946	0	11						
cSH	1700	1700	1700	1700	899	1070						
Volume to Capacity	0.04	0.01	0.01	0.56	0.17	0.01						
Queue Length 95th (ft)	0	0	0	0	15	1						
Control Delay (s)	0.0	0.0	0.0	0.0	9.8	8.4						
Lane LOS					A	A						
Approach Delay (s)	0.0		0.0		9.7							
Approach LOS					A							
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			57.2%		ICU Level of Service		B					
Analysis Period (min)			15									













HCM Unsignalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

												
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	140	70	0	870	210	10	0	280	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	152	76	0	946	228	11	0	304	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)												
pX, platoon unblocked												
vC, conflicting volume	946			152			1098	1098	152	1402	1098	946
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	946			152			1098	1098	152	1402	1098	946
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			100			94	100	66	100	100	100
cM capacity (veh/h)	726			1429			190	213	894	77	213	317
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	152	76	946	228	11	304						
Volume Left	0	0	0	0	11	0						
Volume Right	0	76	0	228	0	304						
cSH	1700	1700	1700	1700	190	894						
Volume to Capacity	0.09	0.04	0.56	0.13	0.06	0.34						
Queue Length 95th (ft)	0	0	0	0	5	38						
Control Delay (s)	0.0	0.0	0.0	0.0	25.1	11.1						
Lane LOS					D	B						
Approach Delay (s)	0.0		0.0		11.6							
Approach LOS					B							
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			55.8%		ICU Level of Service		B					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak

												
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	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)	0	400	80	290	580	0	120	0	120	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)	0	435	87	315	630	0	130	0	130	0	0	0
RTOR Reduction (vph)	0	0	55	0	0	0	0	0	111	0	0	0
Lane Group Flow (vph)	0	435	32	315	630	0	130	0	19	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		18.6	18.6	15.0	37.1		8.7		8.7			
Effective Green, g (s)		20.1	20.1	14.5	38.6		8.2		8.2			
Actuated g/C Ratio		0.37	0.37	0.26	0.70		0.15		0.15			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		683	581	468	1312		265		237			
v/s Ratio Prot		c0.23		c0.18	0.34		c0.07					
v/s Ratio Perm			0.02						0.01			
v/c Ratio		0.64	0.05	0.67	0.48		0.49		0.08			
Uniform Delay, d1		14.3	11.2	18.0	3.6		21.4		20.1			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		2.0	0.0	3.0	0.3		0.5		0.1			
Delay (s)		16.3	11.3	21.0	3.9		21.9		20.1			
Level of Service		B	B	C	A		C		C			
Approach Delay (s)		15.5			9.6			21.0			0.0	
Approach LOS		B			A			C			A	
Intersection Summary												
HCM Average Control Delay			13.1			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			54.8			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.8%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
 Existing Plus Phase 1--AM Peak


























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	40	580	700	10	30	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	630	761	11	33	141
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	772				1484	766
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	772				1484	766
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				75	65
cM capacity (veh/h)	843				130	403

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	674	772	33	141
Volume Left	43	0	33	0
Volume Right	0	11	0	141
cSH	843	1700	130	403
Volume to Capacity	0.05	0.45	0.25	0.35
Queue Length 95th (ft)	4	0	23	39
Control Delay (s)	1.3	0.0	41.6	18.7
Lane LOS	A		E	C
Approach Delay (s)	1.3	0.0	23.0	
Approach LOS			C	

Intersection Summary			
Average Delay		3.0	
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
























HCM Signalized Intersection Capacity Analysis
45: Riego Rd & Road "U"

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1723		1770	1863	1583	1770	1863	1583	1770	1723	
Volume (vph)	10	10	10	10	10	10	10	10	10	10	10	10
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)	11	11	11	11	11	11	11	11	11	11	11	11
RTOR Reduction (vph)	0	3	0	0	0	3	0	0	10	0	10	0
Lane Group Flow (vph)	11	19	0	11	11	8	11	11	1	11	12	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6			4			
Actuated Green, G (s)	1.0	66.1		1.0	66.1	66.1	1.0	5.3	5.3	1.0	5.3	
Effective Green, g (s)	1.0	66.1		1.0	66.1	66.1	1.0	5.3	5.3	1.0	5.3	
Actuated g/C Ratio	0.01	0.74		0.01	0.74	0.74	0.01	0.06	0.06	0.01	0.06	
Clearance Time (s)	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	
Lane Grp Cap (vph)	20	1274		20	1377	1170	20	110	94	20	102	
v/s Ratio Prot	c0.01	c0.01		0.01	0.01		c0.01	0.01		0.01	c0.01	
v/s Ratio Perm						0.01			0.00			
v/c Ratio	0.55	0.02		0.55	0.01	0.01	0.55	0.10	0.01	0.55	0.11	
Uniform Delay, d1	44.0	3.1		44.0	3.1	3.1	44.0	39.8	39.6	44.0	39.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	28.9	0.0		28.9	0.0	0.0	28.9	0.4	0.0	28.9	0.5	
Delay (s)	72.9	3.1		72.9	3.1	3.1	72.9	40.2	39.6	72.9	40.3	
Level of Service	E	A		E	A	A	E	D	D	E	D	
Approach Delay (s)		26.3			26.3			50.9			51.2	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM Average Control Delay			38.7				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.04									
Actuated Cycle Length (s)			89.4				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			21.1%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak





































												
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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Volume (vph)	10	10	10	10	10	50	10	10	10	10	10	10
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)	11	11	11	11	11	54	11	11	11	11	11	11
RTOR Reduction (vph)	0	0	3	0	0	14	0	10	0	0	0	10
Lane Group Flow (vph)	11	11	8	11	11	40	11	12	0	11	11	1
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6						8
Actuated Green, G (s)	1.0	66.1	66.1	1.0	66.1	66.1	1.0	5.3		1.0	5.3	5.3
Effective Green, g (s)	1.0	66.1	66.1	1.0	66.1	66.1	1.0	5.3		1.0	5.3	5.3
Actuated g/C Ratio	0.01	0.74	0.74	0.01	0.74	0.74	0.01	0.06		0.01	0.06	0.06
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)	20	2617	1170	20	2617	1170	20	102		20	110	94
v/s Ratio Prot	c0.01	0.00		0.01	0.00		c0.01	c0.01		0.01	0.01	
v/s Ratio Perm			0.01			c0.03						0.00
v/c Ratio	0.55	0.00	0.01	0.55	0.00	0.03	0.55	0.11		0.55	0.10	0.01
Uniform Delay, d1	44.0	3.0	3.1	44.0	3.0	3.1	44.0	39.8		44.0	39.8	39.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	28.9	0.0	0.0	28.9	0.0	0.1	28.9	0.5		28.9	0.4	0.0
Delay (s)	72.9	3.0	3.1	72.9	3.0	3.2	72.9	40.3		72.9	40.2	39.6
Level of Service	E	A	A	E	A	A	E	D		E	D	D
Approach Delay (s)		26.3			13.2			51.2			50.9	
Approach LOS		C			B			D			D	

Intersection Summary

HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.05		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

































												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	0.88	0.94	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	2787	4990	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	2787	4990	3539	1583
Volume (vph)	10	110	10	420	420	880	10	30	150	390	30	20
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)	11	120	11	457	457	957	11	33	163	424	33	22
RTOR Reduction (vph)	0	0	6	0	0	347	0	0	140	0	0	18
Lane Group Flow (vph)	11	120	5	457	457	610	11	33	23	424	33	5
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	0.8	47.6	47.6	23.1	69.9	69.9	0.8	15.3	15.3	8.0	22.5	22.5
Effective Green, g (s)	0.8	47.6	47.6	23.1	69.9	69.9	0.8	15.3	15.3	8.0	22.5	22.5
Actuated g/C Ratio	0.01	0.43	0.43	0.21	0.64	0.64	0.01	0.14	0.14	0.07	0.20	0.20
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)	25	2200	685	721	3231	1006	25	492	388	363	724	324
v/s Ratio Prot	0.00	0.02		c0.13	0.09		0.00	c0.01		c0.08	0.01	
v/s Ratio Perm			0.00			c0.39			0.01			0.00
v/c Ratio	0.44	0.05	0.01	0.63	0.14	0.61	0.44	0.07	0.06	1.17	0.05	0.01
Uniform Delay, d1	54.4	18.1	17.8	39.6	8.0	11.9	54.4	41.1	41.1	51.0	35.1	34.9
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	11.9	0.0	0.0	1.8	0.1	2.7	11.9	0.1	0.1	101.3	0.0	0.0
Delay (s)	66.3	18.2	17.8	41.4	8.1	14.6	66.3	41.2	41.2	152.3	35.2	34.9
Level of Service	E	B	B	D	A	B	E	D	D	F	D	C
Approach Delay (s)		21.9			19.6			42.5			138.9	
Approach LOS		C			B			D			F	

Intersection Summary

HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			































HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	5085	1583
Volume (vph)	250	470	140	100	1210	130	210	80	40	110	80	500
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)	272	511	152	109	1315	141	228	87	43	120	87	543
RTOR Reduction (vph)	0	0	90	0	0	90	0	0	31	0	0	83
Lane Group Flow (vph)	272	511	62	109	1315	51	228	87	12	120	87	460
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	10.4	40.7	40.7	6.0	36.3	36.3	5.0	27.2	27.2	10.1	32.3	32.3
Effective Green, g (s)	10.4	40.7	40.7	6.0	36.3	36.3	5.0	27.2	27.2	10.1	32.3	32.3
Actuated g/C Ratio	0.10	0.41	0.41	0.06	0.36	0.36	0.05	0.27	0.27	0.10	0.32	0.32
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)	357	2070	644	206	1846	575	172	963	431	347	1642	511
v/s Ratio Prot	c0.08	0.10		0.03	c0.26		c0.07	0.02		0.03	0.02	
v/s Ratio Perm			0.04			0.03			0.01			c0.29
v/c Ratio	0.76	0.25	0.10	0.53	0.71	0.09	1.33	0.09	0.03	0.35	0.05	0.90
Uniform Delay, d1	43.6	19.5	18.3	45.6	27.4	21.0	47.5	27.2	26.7	41.9	23.3	32.3
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	9.3	0.3	0.3	2.4	2.4	0.3	181.0	0.0	0.0	0.6	0.0	18.5
Delay (s)	52.9	19.8	18.6	48.1	29.7	21.3	228.5	27.2	26.7	42.5	23.3	50.8
Level of Service	D	B	B	D	C	C	F	C	C	D	C	D
Approach Delay (s)		29.2			30.3			155.3			46.3	
Approach LOS		C			C			F			D	
Intersection Summary												
HCM Average Control Delay		45.7			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		70.3%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												
























HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	200	380	30	50	900	80	20	30	10	80	60	310
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)	217	413	33	54	978	87	22	33	11	87	65	337
RTOR Reduction (vph)	0	0	15	0	0	44	0	0	10	0	0	169
Lane Group Flow (vph)	217	413	18	54	978	43	22	33	1	87	65	168
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	7.2	43.7	43.7	2.7	39.2	39.2	1.7	10.7	10.7	6.0	15.0	15.0
Effective Green, g (s)	7.2	43.7	43.7	2.7	39.2	39.2	1.7	10.7	10.7	6.0	15.0	15.0
Actuated g/C Ratio	0.09	0.55	0.55	0.03	0.50	0.50	0.02	0.14	0.14	0.08	0.19	0.19
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)	312	2809	875	60	2520	784	38	252	214	134	353	300
v/s Ratio Prot	c0.06	0.08		0.03	c0.19		0.01	0.02		c0.05	0.03	
v/s Ratio Perm			0.01			0.03			0.00			c0.11
v/c Ratio	0.70	0.15	0.02	0.90	0.39	0.05	0.58	0.13	0.01	0.65	0.18	0.56
Uniform Delay, d1	34.9	8.6	8.0	38.1	12.5	10.3	38.3	30.1	29.6	35.5	26.9	29.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	0.1	0.0	81.0	0.5	0.1	19.6	0.2	0.0	10.4	0.3	2.4
Delay (s)	41.5	8.7	8.1	119.1	12.9	10.5	57.9	30.3	29.6	45.9	27.2	31.5
Level of Service	D	A	A	F	B	B	E	C	C	D	C	C
Approach Delay (s)		19.4			17.8			39.4			33.5	
Approach LOS		B			B			D			C	
Intersection Summary												
HCM Average Control Delay			22.2				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			79.1				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			49.9%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
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	0.97	0.95			0.91	1.00				0.97		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)	3433	3539			5085	1583				3433		1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	3433	3539			5085	1583				3433		1583
Volume (vph)	10	340	0	0	730	90	0	0	0	120	0	10
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)	11	370	0	0	793	98	0	0	0	130	0	11
RTOR Reduction (vph)	0	0	0	0	0	41	0	0	0	0	0	8
Lane Group Flow (vph)	11	370	0	0	793	57	0	0	0	130	0	3
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				4			
Permitted Phases					6							4
Actuated Green, G (s)	0.8	47.2			42.4	42.4				18.0		18.0
Effective Green, g (s)	0.8	47.2			42.4	42.4				18.0		18.0
Actuated g/C Ratio	0.01	0.64			0.58	0.58				0.25		0.25
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)	38	2282			2945	917				844		389
v/s Ratio Prot	0.00	c0.10			c0.16				c0.04			
v/s Ratio Perm						0.04						0.00
v/c Ratio	0.29	0.16			0.27	0.06				0.15		0.01
Uniform Delay, d1	35.9	5.2			7.7	6.7				21.6		20.8
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	4.2	0.2			0.2	0.1				0.4		0.0
Delay (s)	40.1	5.3			7.9	6.9				22.0		20.9
Level of Service	D	A			A	A				C		C
Approach Delay (s)		6.3			7.8			0.0			21.9	
Approach LOS		A			A			A			C	
Intersection Summary												
HCM Average Control Delay			8.8		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			73.2		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			24.2%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												



















HCM Signalized Intersection Capacity Analysis
53: Road "T" & Power Line Rd

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	10	10	10	10	10	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	11	11	11
RTOR Reduction (vph)	0	10	0	2	0	0
Lane Group Flow (vph)	11	1	11	9	11	11
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	5.2	5.2	68.0	68.0	1.5	73.5
Effective Green, g (s)	5.2	5.2	68.0	68.0	1.5	73.5
Actuated g/C Ratio	0.06	0.06	0.78	0.78	0.02	0.85
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)	106	95	1461	1242	31	1579
v/s Ratio Prot	c0.01		c0.01		c0.01	0.01
v/s Ratio Perm		0.00		0.01		
v/c Ratio	0.10	0.01	0.01	0.01	0.35	0.01
Uniform Delay, d1	38.5	38.3	2.0	2.0	42.1	1.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.0	0.0	0.0	6.9	0.0
Delay (s)	39.0	38.4	2.0	2.0	49.0	1.0
Level of Service	D	D	A	A	D	A
Approach Delay (s)	38.7		2.0			25.0
Approach LOS	D		A			C
Intersection Summary						
HCM Average Control Delay			21.9		HCM Level of Service	C
HCM Volume to Capacity ratio			0.02			
Actuated Cycle Length (s)			86.7		Sum of lost time (s)	12.0
Intersection Capacity Utilization			17.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
66: Sankey Rd & Road "C"

Sutter Pointe EIR
Existing Plus Phase 1--AM Peak

												
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
Lane Util. Factor	1.00	1.00			1.00	1.00				1.00		1.00
Frt	1.00	1.00			1.00	0.85				1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)	1770	1863			1863	1583				1770		1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	1770	1863			1863	1583				1770		1583
Volume (vph)	10	10	0	0	10	10	0	0	0	10	0	30
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)	11	11	0	0	11	11	0	0	0	11	0	33
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	0	0	0	8
Lane Group Flow (vph)	11	11	0	0	11	1	0	0	0	11	0	25
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	7	4			8				1			
Permitted Phases					8						6	
Actuated Green, G (s)	1.3	13.4			8.1	8.1				70.5		70.5
Effective Green, g (s)	1.3	13.4			8.1	8.1				70.5		70.5
Actuated g/C Ratio	0.01	0.15			0.09	0.09				0.77		0.77
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)	25	272			164	140				1358		1214
v/s Ratio Prot	c0.01	0.01			c0.01				0.01			
v/s Ratio Perm					0.00						c0.02	
v/c Ratio	0.44	0.04			0.07	0.01				0.01		0.02
Uniform Delay, d1	44.9	33.7			38.4	38.2				2.5		2.5
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	11.9	0.1			0.2	0.0				0.0		0.0
Delay (s)	56.8	33.8			38.6	38.3				2.5		2.6
Level of Service	E	C			D	D				A		A
Approach Delay (s)		45.3			38.4				0.0		2.6	
Approach LOS		D			D				A		A	
Intersection Summary												
HCM Average Control Delay			22.2		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.03									
Actuated Cycle Length (s)			91.9		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			17.2%		ICU Level of Service				A			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd
























Sutter Point EIR
 Existing Plus Phase 1--PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	20	10	10	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	10	10	10	21	10	10	10	10	10
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	108	98	15	108	98	15	21			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108	98	15	108	98	15	21			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	841	777	1064	841	777	1064	1595			1595		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	31	31	41	31								
Volume Left	10	10	21	10								
Volume Right	10	10	10	10								
cSH	878	878	1595	1595								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	0								
Control Delay (s)	9.2	9.2	3.7	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	3.7	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			13.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	20	10	70	10	2110	40	20	960	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	21	10	72	10	2175	41	21	990	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		1			1							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2144	3227	495	2737	3227	1088	990			2175		
vC1, stage 1 conf vol	1031	1031		2196	2196							
vC2, stage 2 conf vol	1113	2196		541	1031							
vCu, unblocked vol	2144	3227	495	2737	3227	1088	990			2175		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	78	98	46	83	66	99			91		
cM capacity (veh/h)	71	47	520	38	59	211	694			241		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	21	10	21	10	72	10	1088	1088	41	21	495	495
Volume Left	10	0	21	0	0	10	0	0	0	21	0	0
Volume Right	0	10	0	0	72	0	0	0	41	0	0	0
cSH	57	520	38	59	211	694	1700	1700	1700	241	1700	1700
Volume to Capacity	0.36	0.02	0.54	0.17	0.34	0.01	0.64	0.64	0.02	0.09	0.29	0.29
Queue Length 95th (ft)	33	2	47	14	36	1	0	0	0	7	0	0
Control Delay (s)	100.6	12.1	177.5	77.8	30.7	10.3	0.0	0.0	0.0	21.3	0.0	0.0
Lane LOS	F	B	F	F	D	B				C		
Approach Delay (s)	71.1		64.8			0.0				0.4		
Approach LOS	F		F									
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			76.0%			ICU Level of Service				D		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 3: Sankey Rd & Road "H"

















Sutter Point EIR
 Existing Plus Phase 1--PM Peak



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	50	20	10	50	0	50	0	70	0	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	52	21	10	52	0	52	0	72	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)												
pX, platoon unblocked												
vC, conflicting volume	52			72			134	134	62	206	144	52
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	52			72			134	134	62	206	144	52
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			99			94	100	93	100	100	100
cM capacity (veh/h)	1555			1528			833	752	1003	694	742	1016
Direction, Lane #	EB 1	WB 1	NB 1	NB 2								
Volume Total	72	62	52	72								
Volume Left	0	10	52	0								
Volume Right	21	0	0	72								
cSH	1700	1528	833	1003								
Volume to Capacity	0.04	0.01	0.06	0.07								
Queue Length 95th (ft)	0	1	5	6								
Control Delay (s)	0.0	1.3	9.6	8.9								
Lane LOS		A	A	A								
Approach Delay (s)	0.0	1.3	9.2									
Approach LOS			A									
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			19.9%		ICU Level of Service				A			
Analysis Period (min)			15									

































HCM Unsignalized Intersection Capacity Analysis
 4: Riego Rd & Power Line Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	10	20	20	20	10	10	40	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	21	10	21	21	21	10	10	41	10	10	10
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	41	62	62	31								
Volume Left (vph)	10	21	10	10								
Volume Right (vph)	10	21	41	10								
Hadj (s)	-0.07	-0.10	-0.33	-0.10								
Departure Headway (s)	4.1	4.0	3.8	4.1								
Degree Utilization, x	0.05	0.07	0.07	0.04								
Capacity (veh/h)	854	868	907	854								
Control Delay (s)	7.3	7.3	7.1	7.2								
Approach Delay (s)	7.3	7.3	7.1	7.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.2									
HCM Level of Service			A									
Intersection Capacity Utilization			15.7%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Point EIR
Existing Plus Phase 1 PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Volume (vph)	10	1210	1370	930	840	80	760	2070	1110	60	870	60
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	1247	1412	959	866	82	784	2134	1144	62	897	62
RTOR Reduction (vph)	0	0	275	0	0	45	0	0	0	0	0	0
Lane Group Flow (vph)	10	1247	1137	959	866	37	784	2134	1144	62	897	62
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	12%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	1.6	51.4	51.4	24.0	73.8	73.8	36.0	66.0	162.4	5.0	35.0	162.4
Effective Green, g (s)	1.6	51.4	51.4	24.0	73.8	73.8	36.0	66.0	162.4	5.0	35.0	162.4
Actuated g/C Ratio	0.01	0.32	0.32	0.15	0.45	0.45	0.22	0.41	1.00	0.03	0.22	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	34	1609	501	507	2311	719	392	1359	1583	54	695	1583
v/s Ratio Prot	0.00	0.25		c0.28	0.17		c0.44	c0.64		0.04	0.28	
v/s Ratio Perm			c0.72			0.02			0.72			0.04
v/c Ratio	0.29	0.78	2.27	1.89	0.37	0.05	2.00	1.57	0.72	1.15	1.29	0.04
Uniform Delay, d1	79.8	50.3	55.5	69.2	29.1	24.8	63.2	48.2	0.0	78.7	63.7	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	2.4	577.2	408.6	0.1	0.0	459.0	260.2	2.9	168.7	141.4	0.0
Delay (s)	84.6	52.7	632.7	477.8	29.2	24.8	522.2	308.4	2.9	247.4	205.1	0.0
Level of Service	F	D	F	F	C	C	F	F	A	F	F	A
Approach Delay (s)		359.6			254.6			263.6			195.2	
Approach LOS		F			F			F			F	

























Intersection Summary

HCM Average Control Delay	281.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.95		
Actuated Cycle Length (s)	162.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	145.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group













HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	1863	1583	3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	1863	1583	3433	1863	1583
Volume (vph)	160	1730	10	10	1100	80	70	10	10	90	10	120
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	165	1784	10	10	1134	82	72	10	10	93	10	124
RTOR Reduction (vph)	0	0	4	0	0	39	0	0	10	0	0	112
Lane Group Flow (vph)	165	1784	6	10	1134	43	72	10	0	93	10	12
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6			4			8
Actuated Green, G (s)	3.9	34.5	34.5	0.7	31.3	31.3	2.2	1.7	1.7	6.2	5.7	5.7
Effective Green, g (s)	3.9	34.5	34.5	0.7	31.3	31.3	2.2	1.7	1.7	6.2	5.7	5.7
Actuated g/C Ratio	0.07	0.58	0.58	0.01	0.53	0.53	0.04	0.03	0.03	0.10	0.10	0.10
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)	227	2968	924	41	2693	838	128	54	46	360	180	153
v/s Ratio Prot	c0.05	c0.35		0.00	0.22		c0.02	0.01		0.03	0.01	
v/s Ratio Perm			0.00			0.03			0.00			c0.01
v/c Ratio	0.73	0.60	0.01	0.24	0.42	0.05	0.56	0.19	0.01	0.26	0.06	0.08
Uniform Delay, d1	27.1	7.9	5.1	28.9	8.4	6.7	28.0	28.0	27.9	24.3	24.3	24.3
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	11.0	0.3	0.0	3.1	0.1	0.0	5.6	1.7	0.1	0.4	0.1	0.2
Delay (s)	38.1	8.2	5.1	32.0	8.5	6.7	33.5	29.7	27.9	24.7	24.4	24.5
Level of Service	D	A	A	C	A	A	C	C	C	C	C	C
Approach Delay (s)		10.7			8.6			32.5			24.6	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM Average Control Delay			11.5				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			59.1				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			56.0%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
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		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1583	1770	3539		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1583	1770	3539		1770		1583			
Volume (vph)	0	1060	10	20	590	0	190	0	30	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1093	10	21	608	0	196	0	31	0	0	0
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	23	0	0	0
Lane Group Flow (vph)	0	1093	4	21	608	0	196	0	8	0	0	0
Turn Type			Perm	Prot			custom		custom			
Protected Phases		4		3	8							
Permitted Phases			4				2		2			
Actuated Green, G (s)		16.9	16.9	0.5	21.4		9.5		9.5			
Effective Green, g (s)		16.9	16.9	0.5	21.4		9.5		9.5			
Actuated g/C Ratio		0.43	0.43	0.01	0.55		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)		1538	688	23	1947		432		387			
v/s Ratio Prot		c0.31		0.01	c0.17							
v/s Ratio Perm			0.00				c0.11		0.00			
v/c Ratio		0.71	0.01	0.91	0.31		0.45		0.02			
Uniform Delay, d1		9.0	6.2	19.2	4.8		12.5		11.2			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		1.6	0.0	147.5	0.1		0.8		0.0			
Delay (s)		10.6	6.2	166.7	4.8		13.3		11.2			
Level of Service		B	A	F	A		B		B			
Approach Delay (s)		10.5			10.2			13.0			0.0	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM Average Control Delay			10.7				HCM Level of Service		B			
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			38.9				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			46.5%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Point EIR
 Existing Plus Phase 1--PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	↘
Sign Control		Stop	Stop		Stop	
Volume (vph)	20	1070	600	80	50	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	1103	619	82	52	10
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	1124	619	82	62		
Volume Left (vph)	21	0	0	52		
Volume Right (vph)	0	0	82	10		
Hadj (s)	0.04	0.03	-0.67	0.10		
Departure Headway (s)	5.1	5.3	4.6	7.0		
Degree Utilization, x	1.58	0.92	0.11	0.12		
Capacity (veh/h)	698	670	765	503		
Control Delay (s)	282.1	38.8	7.0	10.9		
Approach Delay (s)	282.1	35.1		10.9		
Approach LOS	F	E		B		
Intersection Summary						
Delay			181.4			
HCM Level of Service			F			
Intersection Capacity Utilization			82.4%		ICU Level of Service	E
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	↗
Sign Control	Stop			Stop	Stop	
Volume (vph)	890	230	40	590	90	60
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	918	237	41	608	93	62
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	918	237	649	155		
Volume Left (vph)	0	0	41	93		
Volume Right (vph)	0	237	0	62		
Hadj (s)	0.03	-0.67	0.05	-0.09		
Departure Headway (s)	5.9	5.2	5.5	6.9		
Degree Utilization, x	1.49	0.34	0.99	0.30		
Capacity (veh/h)	606	691	649	517		
Control Delay (s)	246.9	9.6	57.0	12.8		
Approach Delay (s)	198.2		57.0	12.8		
Approach LOS	F		F	B		
Intersection Summary						
Delay			136.7			
HCM Level of Service			F			
Intersection Capacity Utilization			79.2%	ICU Level of Service	D	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	920	20	40	610	30	10	10	190	60	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	948	21	41	629	31	10	10	196	62	10	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	979	701	216	82
Volume Left (vph)	10	41	10	62
Volume Right (vph)	21	31	196	10
Hadj (s)	0.02	0.02	-0.50	0.11
Departure Headway (s)	6.1	6.1	7.0	8.2
Degree Utilization, x	1.67	1.19	0.42	0.19
Capacity (veh/h)	584	594	506	418
Control Delay (s)	324.7	124.8	14.9	13.0
Approach Delay (s)	324.7	124.8	14.9	13.0
Approach LOS	F	F	B	B

Intersection Summary			
Delay		207.0	
HCM Level of Service		F	
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1030	610	20	20	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1062	629	21	21	10
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	649				1722	639
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	649				1722	639
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				79	98
cM capacity (veh/h)	937				97	476

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1072	649	31
Volume Left	10	0	21
Volume Right	0	21	10
cSH	937	1700	132
Volume to Capacity	0.01	0.38	0.23
Queue Length 95th (ft)	1	0	21
Control Delay (s)	0.3	0.0	40.4
Lane LOS	A		E
Approach Delay (s)	0.3	0.0	40.4
Approach LOS			E

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		72.2%	ICU Level of Service C
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

	→	↘	↙	←	↖	↗
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)	830	290	270	450	190	340
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	856	299	278	464	196	351
RTOR Reduction (vph)	0	143	0	0	0	80
Lane Group Flow (vph)	856	156	278	464	196	271
Turn Type		Perm	Prot		pm+ov	
Protected Phases	2		1	6	4	1
Permitted Phases		2				4
Actuated Green, G (s)	37.2	37.2	14.4	55.2	9.4	23.8
Effective Green, g (s)	39.2	39.2	14.0	57.2	9.7	23.7
Actuated g/C Ratio	0.52	0.52	0.19	0.76	0.13	0.32
Clearance Time (s)	6.0	6.0	3.6	6.0	4.3	3.6
Vehicle Extension (s)	2.0	2.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)	975	828	331	1423	229	585
v/s Ratio Prot	c0.46		c0.16	0.25	c0.11	0.09
v/s Ratio Perm		0.10				0.08
v/c Ratio	0.88	0.19	0.84	0.33	0.86	0.46
Uniform Delay, d1	15.7	9.4	29.4	2.8	31.9	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.8	0.0	16.2	0.0	24.7	0.2
Delay (s)	24.5	9.5	45.5	2.8	56.6	20.7
Level of Service	C	A	D	A	E	C
Approach Delay (s)	20.6			18.8	33.6	
Approach LOS	C			B	C	

Intersection Summary

HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3490		1770	3539	1583	1770	3539	1583	1770	1863	1583	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	3490		1770	3539	1583	1770	3539	1583	1770	1863	1583	
Volume (vph)	560	690	70	250	260	160	30	460	280	50	420	340	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	577	711	72	258	268	165	31	474	289	52	433	351	
RTOR Reduction (vph)	0	5	0	0	0	122	0	0	206	0	0	213	
Lane Group Flow (vph)	577	778	0	258	268	43	31	474	83	52	433	138	
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm	
Protected Phases	7	4		3	8		5	2		1		6	
Permitted Phases						8			2			6	
Actuated Green, G (s)	42.5	42.3		20.9	20.7	20.7	2.1	32.3	32.3	4.1	34.3	34.3	
Effective Green, g (s)	42.5	44.3		20.9	22.7	22.7	2.1	34.3	34.3	4.1	36.3	36.3	
Actuated g/C Ratio	0.36	0.37		0.17	0.19	0.19	0.02	0.29	0.29	0.03	0.30	0.30	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	
Vehicle Extension (s)	3.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	
Lane Grp Cap (vph)	629	1293		309	672	300	31	1015	454	61	565	480	
v/s Ratio Prot	c0.33	c0.22		0.15	0.08		0.02	0.13		c0.03	c0.23		
v/s Ratio Perm						0.03			0.05			0.09	
v/c Ratio	0.92	0.60		0.83	0.40	0.14	1.00	0.47	0.18	0.85	0.77	0.29	
Uniform Delay, d1	36.9	30.5		47.7	42.5	40.4	58.8	35.1	32.1	57.4	37.8	31.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.2	1.1		16.7	0.8	0.4	161.6	0.7	0.4	63.6	7.1	0.6	
Delay (s)	55.1	31.6		64.4	43.2	40.8	220.4	35.8	32.5	121.0	44.9	32.4	
Level of Service	E	C		E	D	D	F	D	C	F	D	C	
Approach Delay (s)		41.6			50.5			41.8			44.4		
Approach LOS		D			D			D			D		
Intersection Summary													
HCM Average Control Delay			44.0									HCM Level of Service	D
HCM Volume to Capacity ratio			0.76										
Actuated Cycle Length (s)			119.6									Sum of lost time (s)	8.0
Intersection Capacity Utilization			77.0%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												






















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	50	10	10	20	30	10	30	20	10	20	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	52	10	10	21	31	10	31	21	10	21	10
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	72	62	62	41								
Volume Left (vph)	10	10	10	10								
Volume Right (vph)	10	31	21	10								
Hadj (s)	-0.02	-0.23	-0.13	-0.07								
Departure Headway (s)	4.2	4.0	4.1	4.2								
Degree Utilization, x	0.08	0.07	0.07	0.05								
Capacity (veh/h)	838	879	842	828								
Control Delay (s)	7.5	7.3	7.4	7.4								
Approach Delay (s)	7.5	7.3	7.4	7.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				7.4								
HCM Level of Service				A								
Intersection Capacity Utilization				15.5%	ICU Level of Service							A
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
 15: Elverta Rd & Hwy 99

















Sutter Point EIR
 Existing Plus Phase 1--PM Peak

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1765		1681	1599		1770	2888	1583	1770	3343	1583
Flt Permitted		0.99		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1765		1681	1599		1770	2888	1583	1770	3343	1583
Volume (vph)	20	30	20	90	10	40	20	3090	600	180	2390	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	31	21	93	10	41	21	3186	619	186	2464	10
RTOR Reduction (vph)	0	10	0	0	30	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	63	0	69	45	0	21	3186	619	186	2464	10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Split		Prot		Free		Prot		Free	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									Free			Free
Actuated Green, G (s)		8.9		10.9	10.9		2.3	94.2	140.1	10.1	102.0	140.1
Effective Green, g (s)		8.9		10.9	10.9		2.3	94.2	140.1	10.1	102.0	140.1
Actuated g/C Ratio		0.06		0.08	0.08		0.02	0.67	1.00	0.07	0.73	1.00
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		112		131	124		29	1942	1583	128	2434	1583
v/s Ratio Prot		0.04		0.04	0.03		0.01	c1.10		c0.11	0.74	
v/s Ratio Perm									c0.39			0.01
v/c Ratio		0.56		0.53	0.37		0.72	1.64	0.39	1.45	1.01	0.01
Uniform Delay, d1		63.7		62.1	61.3		68.6	22.9	0.0	65.0	19.0	0.0
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		6.0		3.8	1.8		61.8	290.6	0.7	241.9	21.3	0.0
Delay (s)		69.7		65.9	63.2		130.4	313.6	0.7	306.9	40.4	0.0
Level of Service		E		E	E		F	F	A	F	D	A
Approach Delay (s)		69.7			64.5			261.9			58.9	
Approach LOS		E			E			F			E	
Intersection Summary												
HCM Average Control Delay		175.0		HCM Level of Service				F				
HCM Volume to Capacity ratio		1.36										
Actuated Cycle Length (s)		140.1		Sum of lost time (s)				8.0				
Intersection Capacity Utilization		116.0%		ICU Level of Service				H				
Analysis Period (min)		15										

c Critical Lane Group

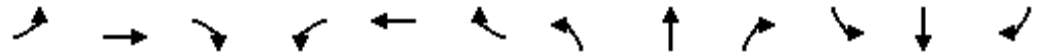
HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	690	10	30	130	170	10	50	100	10	20	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	711	10	31	134	175	10	52	103	10	21	10
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	742	340	165	41								
Volume Left (vph)	21	31	10	10								
Volume Right (vph)	10	175	103	10								
Hadj (s)	0.03	-0.26	-0.33	-0.07								
Departure Headway (s)	5.1	5.3	6.2	6.8								
Degree Utilization, x	1.06	0.50	0.28	0.08								
Capacity (veh/h)	696	667	555	479								
Control Delay (s)	71.4	13.4	11.6	10.4								
Approach Delay (s)	71.4	13.4	11.6	10.4								
Approach LOS	F	B	B	B								
Intersection Summary												
Delay			46.5									
HCM Level of Service			E									
Intersection Capacity Utilization			57.9%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak



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)	60	740	0	0	300	10	0	0	0	40	0	30
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	62	763	0	0	309	10	0	0	0	41	0	31
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	320			763			1232	1206	763	1201	1201	314
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320			763			1232	1206	763	1201	1201	314
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			100	100	100	73	100	96
cM capacity (veh/h)	1240			850			142	174	404	156	176	726

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	825	320	0	72
Volume Left	62	0	0	41
Volume Right	0	10	0	31
cSH	1240	1700	1700	234
Volume to Capacity	0.05	0.19	0.00	0.31
Queue Length 95th (ft)	4	0	0	31
Control Delay (s)	1.3	0.0	0.0	27.0
Lane LOS	A		A	D
Approach Delay (s)	1.3	0.0	0.0	27.0
Approach LOS			A	D

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	600	280	20	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	619	289	21	10	10
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	309				938	299
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	309				938	299
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	99
cM capacity (veh/h)	1251				291	741

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	629	309	21
Volume Left	10	0	10
Volume Right	0	21	10
cSH	1251	1700	418
Volume to Capacity	0.01	0.18	0.05
Queue Length 95th (ft)	1	0	4
Control Delay (s)	0.2	0.0	14.1
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	14.1
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		






























HCM Unsignalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

												
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)	70	570	10	70	280	10	10	20	90	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	72	588	10	72	289	10	10	21	93	10	10	10
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	299			598			1191	1180	593	1278	1180	294
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	299			598			1191	1180	593	1278	1180	294
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 %	94			93			93	88	82	89	94	99
cM capacity (veh/h)	1262			979			140	166	506	96	166	745
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	670	371	124	31								
Volume Left	72	72	10	10								
Volume Right	10	10	93	10								
cSH	1262	979	324	168								
Volume to Capacity	0.06	0.07	0.38	0.18								
Queue Length 95th (ft)	5	6	43	16								
Control Delay (s)	1.5	2.4	22.8	31.1								
Lane LOS	A	A	C	D								
Approach Delay (s)	1.5	2.4	22.8	31.1								
Approach LOS			C	D								
Intersection Summary												
Average Delay			4.7									
Intersection Capacity Utilization			54.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave













Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	300	430	150	280	200	110	370	610	380	180	440	150
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	309	443	155	289	206	113	381	629	392	186	454	155
RTOR Reduction (vph)	0	0	113	0	0	83	0	0	219	0	0	114
Lane Group Flow (vph)	309	443	42	289	206	30	381	629	173	186	454	41
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	8.6	20.7	20.7	8.1	20.5	20.5	10.6	24.2	24.2	6.3	19.9	19.9
Effective Green, g (s)	10.1	22.4	22.4	9.6	21.9	21.9	12.1	25.9	25.9	7.8	21.6	21.6
Actuated g/C Ratio	0.12	0.27	0.27	0.12	0.27	0.27	0.15	0.32	0.32	0.10	0.26	0.26
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	424	970	434	403	949	424	508	1612	502	328	1344	419
v/s Ratio Prot	c0.09	c0.13		0.08	0.06		c0.11	c0.12		0.05	0.09	
v/s Ratio Perm			0.03			0.02			0.11			0.03
v/c Ratio	0.73	0.46	0.10	0.72	0.22	0.07	0.75	0.39	0.34	0.57	0.34	0.10
Uniform Delay, d1	34.5	24.6	22.1	34.7	23.2	22.3	33.4	21.7	21.4	35.3	24.3	22.7
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	5.2	0.9	0.3	5.0	0.2	0.2	5.5	0.4	1.0	1.3	0.4	0.2
Delay (s)	39.7	25.5	22.4	39.8	23.5	22.5	38.8	22.1	22.4	36.7	24.6	22.9
Level of Service	D	C	C	D	C	C	D	C	C	D	C	C
Approach Delay (s)		29.8			31.0			26.7			27.1	
Approach LOS		C			C			C			C	

Intersection Summary		
HCM Average Control Delay	28.3	HCM Level of Service C
HCM Volume to Capacity ratio	0.49	
Actuated Cycle Length (s)	81.7	Sum of lost time (s) 8.0
Intersection Capacity Utilization	52.3%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		













HCM Unsignalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

												
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	290	30	0	50	360	0	0	0	340	0	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	299	31	0	52	371	0	0	0	351	0	10
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	52			299			361	351	299	351	351	52
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	52			299			361	351	299	351	351	52
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			100			100	100	100	42	100	99
cM capacity (veh/h)	1555			1262			589	574	741	604	574	1016
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2						
Volume Total	299	31	52	371	351	10						
Volume Left	0	0	0	0	351	0						
Volume Right	0	31	0	371	0	10						
cSH	1700	1700	1700	1700	604	1016						
Volume to Capacity	0.18	0.02	0.03	0.22	0.58	0.01						
Queue Length 95th (ft)	0	0	0	0	93	1						
Control Delay (s)	0.0	0.0	0.0	0.0	18.9	8.6						
Lane LOS					C	A						
Approach Delay (s)	0.0		0.0		18.6							
Approach LOS					C							
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			40.8%		ICU Level of Service				A			
Analysis Period (min)			15									













HCM Unsignalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Point EIR
 Existing Plus Phase 1--PM Peak

												
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	340	290	0	360	220	50	0	1070	0	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	351	299	0	371	227	52	0	1103	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)												
pX, platoon unblocked												
vC, conflicting volume	371			351			722	722	351	1825	722	371
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	371			351			722	722	351	1825	722	371
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			100			85	100	0	0	100	100
cM capacity (veh/h)	1187			1208			342	353	693	0	353	675
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	351	299	371	227	52	1103						
Volume Left	0	0	0	0	52	0						
Volume Right	0	299	0	227	0	1103						
cSH	1700	1700	1700	1700	342	693						
Volume to Capacity	0.21	0.18	0.22	0.13	0.15	1.59						
Queue Length 95th (ft)	0	0	0	0	13	1459						
Control Delay (s)	0.0	0.0	0.0	0.0	17.4	289.9						
Lane LOS					C	F						
Approach Delay (s)	0.0		0.0		277.7							
Approach LOS					F							
Intersection Summary												
Average Delay			133.5									
Intersection Capacity Utilization			90.8%	ICU Level of Service	E							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
23: Elkhorn Blvd & Natomas Blvd

Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
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	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)	0	620	90	150	290	0	60	0	310	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	639	93	155	299	0	62	0	320	0	0	0
RTOR Reduction (vph)	0	0	49	0	0	0	0	0	275	0	0	0
Lane Group Flow (vph)	0	639	44	155	299	0	62	0	45	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		23.1	23.1	8.3	34.9		7.8		7.8			
Effective Green, g (s)		24.6	24.6	7.8	36.4		7.3		7.3			
Actuated g/C Ratio		0.48	0.48	0.15	0.70		0.14		0.14			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		886	753	267	1312		250		224			
v/s Ratio Prot		c0.34		c0.09	0.16		c0.04					
v/s Ratio Perm			0.03						0.03			
v/c Ratio		0.72	0.06	0.58	0.23		0.25		0.20			
Uniform Delay, d1		10.8	7.3	20.4	2.7		19.8		19.6			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		2.9	0.0	2.1	0.1		0.2		0.2			
Delay (s)		13.7	7.3	22.5	2.8		19.9		19.8			
Level of Service		B	A	C	A		B		B			
Approach Delay (s)		12.9			9.5			19.8			0.0	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM Average Control Delay			13.6				HCM Level of Service		B			
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			51.7				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			58.5%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Point EIR
 Existing Plus Phase 1--PM Peak


























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	130	810	440	40	20	50
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	134	835	454	41	21	52
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	495				1577	474
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	495				1577	474
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				80	91
cM capacity (veh/h)	1069				105	590

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	969	495	21	52
Volume Left	134	0	21	0
Volume Right	0	41	0	52
cSH	1069	1700	105	590
Volume to Capacity	0.13	0.29	0.20	0.09
Queue Length 95th (ft)	11	0	17	7
Control Delay (s)	3.1	0.0	47.3	11.7
Lane LOS	A		E	B
Approach Delay (s)	3.1	0.0	21.9	
Approach LOS			C	

Intersection Summary			
Average Delay		3.0	
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		



























HCM Signalized Intersection Capacity Analysis
45: Riego Rd & Road "U"

Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1818		1770	1863	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1818		1770	1863	1583	1770	1863	1583	1770	1723	
Volume (vph)	10	50	10	10	40	10	10	10	10	10	10	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	52	10	10	41	10	10	10	10	10	10	10
RTOR Reduction (vph)	0	3	0	0	0	3	0	0	9	0	9	0
Lane Group Flow (vph)	10	59	0	10	41	7	10	10	1	10	11	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6			4			
Actuated Green, G (s)	1.0	66.8		1.0	66.8	66.8	1.0	5.4	5.4	1.0	5.4	
Effective Green, g (s)	1.0	66.8		1.0	66.8	66.8	1.0	5.4	5.4	1.0	5.4	
Actuated g/C Ratio	0.01	0.74		0.01	0.74	0.74	0.01	0.06	0.06	0.01	0.06	
Clearance Time (s)	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	
Lane Grp Cap (vph)	20	1346		20	1380	1172	20	112	95	20	103	
v/s Ratio Prot	c0.01	c0.03		0.01	0.02		c0.01	0.01		0.01	c0.01	
v/s Ratio Perm						0.00			0.00			
v/c Ratio	0.50	0.04		0.50	0.03	0.01	0.50	0.09	0.01	0.50	0.10	
Uniform Delay, d1	44.4	3.1		44.4	3.1	3.0	44.4	40.1	39.9	44.4	40.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.3	0.1		18.3	0.0	0.0	18.3	0.3	0.0	18.3	0.4	
Delay (s)	62.7	3.2		62.7	3.1	3.1	62.7	40.4	39.9	62.7	40.5	
Level of Service	E	A		E	A	A	E	D	D	E	D	
Approach Delay (s)		11.5			12.9			47.7			47.9	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM Average Control Delay			23.2				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.06									
Actuated Cycle Length (s)			90.2				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			21.1%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												




































HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Volume (vph)	20	20	10	10	20	70	10	10	10	610	10	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	21	10	10	21	72	10	10	10	629	10	21
RTOR Reduction (vph)	0	0	7	0	0	50	0	9	0	0	0	11
Lane Group Flow (vph)	21	21	3	10	21	22	10	11	0	629	10	10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6						8
Actuated Green, G (s)	1.3	28.4	28.4	0.6	27.7	27.7	0.6	5.8		37.9	43.1	43.1
Effective Green, g (s)	1.3	28.4	28.4	0.6	27.7	27.7	0.6	5.8		37.9	43.1	43.1
Actuated g/C Ratio	0.01	0.32	0.32	0.01	0.31	0.31	0.01	0.07		0.43	0.49	0.49
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)	26	1133	507	12	1105	494	12	113		756	905	769
v/s Ratio Prot	c0.01	0.01		0.01	0.01		0.01	c0.01		c0.36	0.01	
v/s Ratio Perm			0.00			c0.01						0.01
v/c Ratio	0.81	0.02	0.01	0.83	0.02	0.05	0.83	0.09		0.83	0.01	0.01
Uniform Delay, d1	43.6	20.6	20.5	44.0	21.1	21.3	44.0	39.0		22.6	11.8	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	94.5	0.0	0.0	168.3	0.0	0.2	168.3	0.4		7.8	0.0	0.0
Delay (s)	138.1	20.6	20.6	212.3	21.1	21.5	212.3	39.3		30.4	11.8	11.8
Level of Service	F	C	C	F	C	C	F	D		C	B	B
Approach Delay (s)		68.1			39.9			97.0			29.5	
Approach LOS		E			D			F			C	
Intersection Summary												
HCM Average Control Delay			35.5				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			88.7				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			54.9%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"


































Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	0.88	0.94	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	2787	4990	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	2787	4990	3539	1583
Volume (vph)	10	870	40	400	210	1050	20	100	560	1160	60	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	897	41	412	216	1082	21	103	577	1196	62	10
RTOR Reduction (vph)	0	0	30	0	0	467	0	0	222	0	0	6
Lane Group Flow (vph)	10	897	11	412	216	615	21	103	355	1196	62	4
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6			4			8
Actuated Green, G (s)	2.0	37.2	37.2	24.8	60.0	60.0	4.1	24.0	24.0	32.0	51.9	51.9
Effective Green, g (s)	2.0	37.2	37.2	24.8	60.0	60.0	4.1	24.0	24.0	32.0	51.9	51.9
Actuated g/C Ratio	0.01	0.28	0.28	0.19	0.45	0.45	0.03	0.18	0.18	0.24	0.39	0.39
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)	51	1412	439	635	2277	709	105	634	499	1192	1371	613
v/s Ratio Prot	0.00	0.18		c0.12	0.04		0.01	0.03		c0.24	0.02	
v/s Ratio Perm			0.01			c0.39			c0.13			0.00
v/c Ratio	0.20	0.64	0.03	0.65	0.09	0.87	0.20	0.16	0.71	1.00	0.05	0.01
Uniform Delay, d1	65.2	42.4	35.2	50.6	21.3	33.4	63.4	46.5	51.7	51.0	25.6	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	2.2	0.1	2.3	0.1	13.6	0.9	0.1	4.8	26.9	0.0	0.0
Delay (s)	67.1	44.6	35.3	52.9	21.4	47.0	64.3	46.6	56.5	77.9	25.6	25.2
Level of Service	E	D	D	D	C	D	E	D	E	E	C	C
Approach Delay (s)		44.5			45.2			55.3			74.9	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"

Sutter Point EIR
Existing Plus Phase 1--PM Peak































												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	5085	1583
Volume (vph)	750	1320	310	180	850	210	420	240	330	340	130	580
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	773	1361	320	186	876	216	433	247	340	351	134	598
RTOR Reduction (vph)	0	0	176	0	0	156	0	0	144	0	0	273
Lane Group Flow (vph)	773	1361	144	186	876	60	433	247	196	351	134	325
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	33.6	58.6	58.6	11.2	36.2	36.2	15.0	30.2	30.2	14.0	29.2	29.2
Effective Green, g (s)	33.6	58.6	58.6	11.2	36.2	36.2	15.0	30.2	30.2	14.0	29.2	29.2
Actuated g/C Ratio	0.26	0.45	0.45	0.09	0.28	0.28	0.12	0.23	0.23	0.11	0.22	0.22
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)	887	2292	714	296	1416	441	396	822	368	370	1142	356
v/s Ratio Prot	c0.23	c0.27		0.05	0.17		c0.13	0.07		0.10	0.03	
v/s Ratio Perm			0.09			0.04			0.12			c0.21
v/c Ratio	0.87	0.59	0.20	0.63	0.62	0.14	1.09	0.30	0.53	0.95	0.12	0.91
Uniform Delay, d1	46.1	26.8	21.6	57.4	40.9	35.2	57.5	41.2	43.7	57.6	40.1	49.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.4	1.1	0.6	4.1	2.0	0.6	72.8	0.2	1.5	33.3	0.0	26.9
Delay (s)	55.5	27.9	22.2	61.5	42.9	35.8	130.3	41.4	45.2	90.9	40.2	76.1
Level of Service	E	C	C	E	D	D	F	D	D	F	D	E
Approach Delay (s)		35.9			44.4			80.4			76.5	
Approach LOS		D			D			F			E	

Intersection Summary

HCM Average Control Delay	53.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			
























HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Point EIR
Existing Plus Phase 1--PM Peak

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	650	880	90	60	680	110	100	70	40	90	70	350
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	670	907	93	62	701	113	103	72	41	93	72	361
RTOR Reduction (vph)	0	0	43	0	0	65	0	0	35	0	0	246
Lane Group Flow (vph)	670	907	50	62	701	48	103	72	6	93	72	115
Turn Type	Prot		Perm	Prot	Perm		Prot	Perm		Prot	Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	16.2	48.1	48.1	6.5	38.4	38.4	5.1	12.3	12.3	7.2	14.4	14.4
Effective Green, g (s)	16.2	48.1	48.1	6.5	38.4	38.4	5.1	12.3	12.3	7.2	14.4	14.4
Actuated g/C Ratio	0.18	0.53	0.53	0.07	0.43	0.43	0.06	0.14	0.14	0.08	0.16	0.16
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)	617	2715	845	128	2167	675	100	254	216	141	298	253
v/s Ratio Prot	c0.20	c0.18		0.04	0.14		c0.06	0.04		0.05	0.04	
v/s Ratio Perm			0.03			0.03			0.00			c0.07
v/c Ratio	1.09	0.33	0.06	0.48	0.32	0.07	1.03	0.28	0.03	0.66	0.24	0.45
Uniform Delay, d1	36.9	11.9	10.1	40.2	17.2	15.3	42.5	34.9	33.7	40.3	33.1	34.3
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	61.7	0.3	0.1	2.9	0.4	0.2	98.3	0.6	0.0	10.6	0.4	1.3
Delay (s)	98.7	12.2	10.2	43.1	17.6	15.5	140.8	35.6	33.8	50.9	33.5	35.6
Level of Service	F	B	B	D	B	B	F	D	C	D	C	D
Approach Delay (s)		46.8			19.1			85.4			38.0	
Approach LOS		D			B			F			D	
Intersection Summary												
HCM Average Control Delay			40.6	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			90.1	Sum of lost time (s)				8.0				
Intersection Capacity Utilization			53.9%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"

Sutter Point EIR
Existing Plus Phase 1--PM Peak

													
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	
Lane Util. Factor	0.97	0.95			0.91	1.00				0.97		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)	3433	3539			5085	1583				3433		1583	
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00	
Satd. Flow (perm)	3433	3539			5085	1583				3433		1583	
Volume (vph)	10	780	0	0	600	130	0	0	0	160	0	10	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	10	804	0	0	619	134	0	0	0	165	0	10	
RTOR Reduction (vph)	0	0	0	0	0	56	0	0	0	0	0	8	
Lane Group Flow (vph)	10	804	0	0	619	78	0	0	0	165	0	2	
Turn Type	Prot			Perm						Prot		custom	
Protected Phases	5	2			6					4			
Permitted Phases					6							4	
Actuated Green, G (s)	0.8	47.2			42.4	42.4				18.0		18.0	
Effective Green, g (s)	0.8	47.2			42.4	42.4				18.0		18.0	
Actuated g/C Ratio	0.01	0.64			0.58	0.58				0.25		0.25	
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)	38	2282			2945	917				844		389	
v/s Ratio Prot	0.00	c0.23			0.12					c0.05			
v/s Ratio Perm					0.05							0.00	
v/c Ratio	0.26	0.35			0.21	0.08				0.20		0.01	
Uniform Delay, d1	35.9	6.0			7.4	6.8				21.9		20.8	
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00	
Incremental Delay, d2	3.7	0.4			0.2	0.2				0.5		0.0	
Delay (s)	39.6	6.4			7.5	7.0				22.4		20.9	
Level of Service	D	A			A	A				C		C	
Approach Delay (s)		6.8			7.4			0.0			22.3		
Approach LOS		A			A			A				C	
Intersection Summary													
HCM Average Control Delay			8.6		HCM Level of Service					A			
HCM Volume to Capacity ratio			0.31										
Actuated Cycle Length (s)			73.2		Sum of lost time (s)					8.0			
Intersection Capacity Utilization			32.8%		ICU Level of Service					A			
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
53: Road "T" & Power Line Rd

Sutter Point EIR
Existing Plus Phase 1--PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	10	10	40	10	10	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	41	10	10	21
RTOR Reduction (vph)	0	9	0	2	0	0
Lane Group Flow (vph)	10	1	41	8	10	21
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	5.3	5.3	70.2	70.2	1.5	75.7
Effective Green, g (s)	5.3	5.3	70.2	70.2	1.5	75.7
Actuated g/C Ratio	0.06	0.06	0.79	0.79	0.02	0.85
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)	105	94	1469	1249	30	1585
v/s Ratio Prot	c0.01		c0.02		c0.01	0.01
v/s Ratio Perm		0.00		0.00		
v/c Ratio	0.10	0.01	0.03	0.01	0.33	0.01
Uniform Delay, d1	39.6	39.4	2.0	2.0	43.3	1.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.0	0.0	0.0	6.5	0.0
Delay (s)	40.0	39.4	2.0	2.0	49.7	1.0
Level of Service	D	D	A	A	D	A
Approach Delay (s)	39.7		2.0			16.7
Approach LOS	D		A			B
Intersection Summary						
HCM Average Control Delay			13.9		HCM Level of Service	B
HCM Volume to Capacity ratio			0.04			
Actuated Cycle Length (s)			89.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			17.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

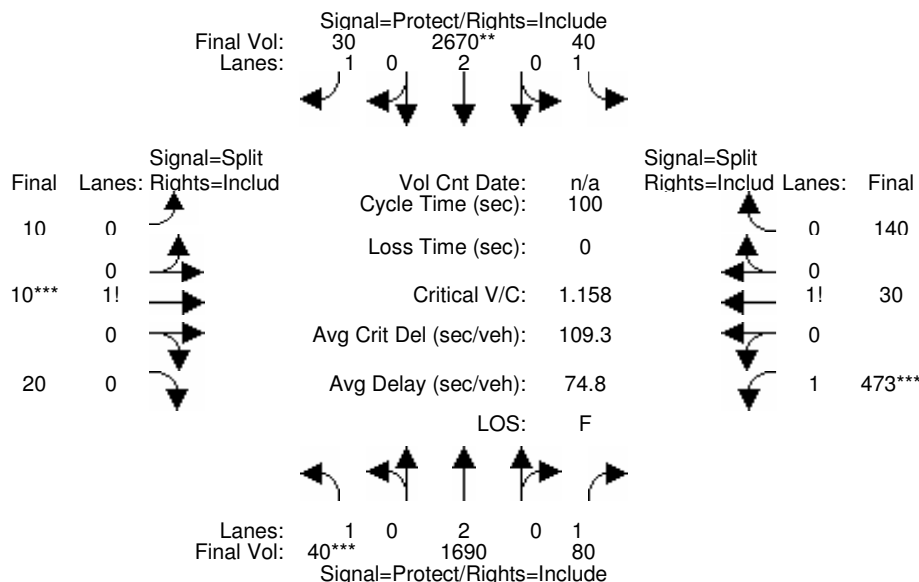
HCM Signalized Intersection Capacity Analysis
66: Sankey Rd & Road "C"

Sutter Point EIR
Existing Plus Phase 1--PM Peak

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
Lane Util. Factor	1.00	1.00			1.00	1.00				1.00		1.00
Frt	1.00	1.00			1.00	0.85				1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)	1770	1863			1863	1583				1770		1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	1770	1863			1863	1583				1770		1583
Volume (vph)	20	10	0	0	10	10	0	0	0	10	0	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	10	0	0	10	10	0	0	0	10	0	21
RTOR Reduction (vph)	0	0	0	0	0	1	0	0	0	0	0	21
Lane Group Flow (vph)	21	10	0	0	10	9	0	0	0	10	0	0
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				4			
Permitted Phases					6							4
Actuated Green, G (s)	2.2	107.3			101.1	101.1				2.5		2.5
Effective Green, g (s)	2.2	107.3			101.1	101.1				2.5		2.5
Actuated g/C Ratio	0.02	0.91			0.86	0.86				0.02		0.02
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)	33	1697			1599	1359				38		34
v/s Ratio Prot	c0.01	0.01			0.01				c0.01			
v/s Ratio Perm					c0.01							0.00
v/c Ratio	0.64	0.01			0.01	0.01				0.26		0.01
Uniform Delay, d1	57.4	0.5			1.2	1.2				56.7		56.4
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	33.9	0.0			0.0	0.0				3.7		0.2
Delay (s)	91.3	0.5			1.2	1.2				60.4		56.6
Level of Service	F	A			A	A				E		E
Approach Delay (s)		62.0			1.2				0.0		57.8	
Approach LOS		E			A				A		E	
Intersection Summary												
HCM Average Control Delay	45.6				HCM Level of Service				D			
HCM Volume to Capacity ratio	0.03											
Actuated Cycle Length (s)	117.8				Sum of lost time (s)				12.0			
Intersection Capacity Utilization	17.8%				ICU Level of Service				A			
Analysis Period (min)	15											
c Critical Lane Group												

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 AM

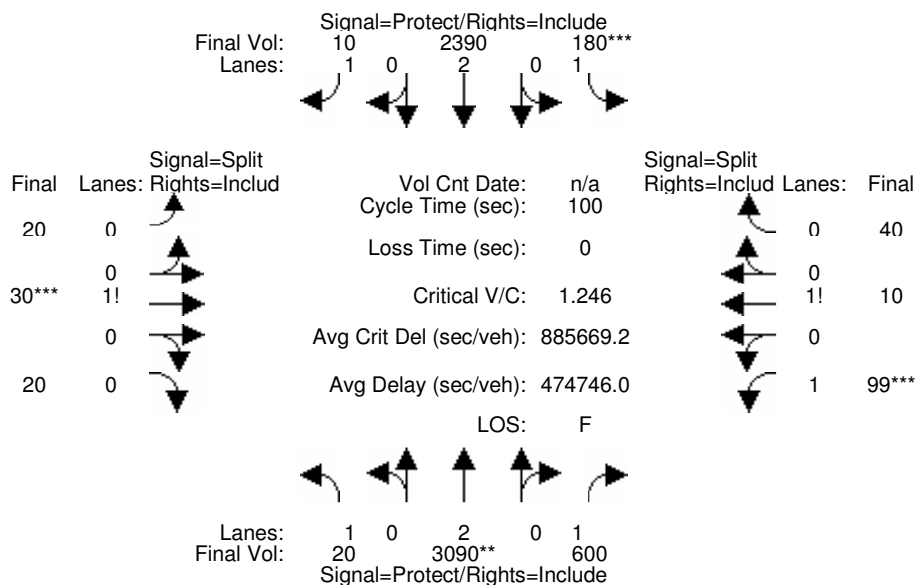
Intersection #15: Elverta Road / SR 70 / SR 99



Street Name:	SR 70 / SR 99						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	40	1690	80	40	2670	30	10	10	20	430	30	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	40	1690	80	40	2670	30	10	10	20	430	30	140
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	40	1690	80	40	2670	30	10	10	20	430	30	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	40	1690	80	40	2670	30	10	10	20	430	30	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	40	1690	80	40	2670	30	10	10	20	430	30	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	40	1690	80	40	2670	30	10	10	20	473	30	140
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.25	0.25	0.50	1.47	0.09	0.44
Final Sat.:	1500	3000	1500	1500	3000	1500	375	375	750	2207	140	653
Capacity Analysis Module:												
Vol/Sat:	0.03	0.56	0.05	0.03	0.89	0.02	0.03	0.03	0.03	0.21	0.21	0.21
Crit Volume:	40			1335			40			322		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 PM

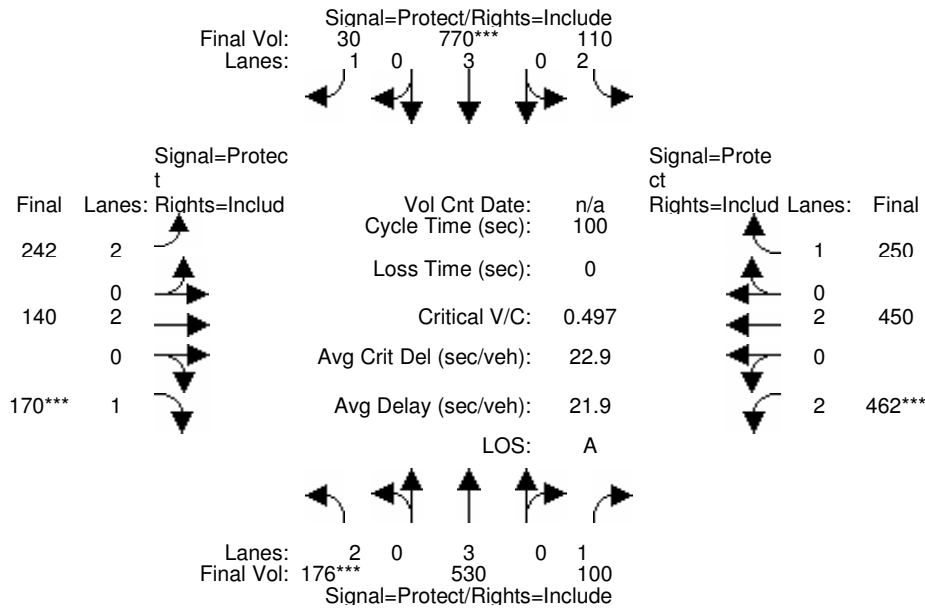
Intersection #15: Elverta Road / SR 70 / SR 99



Street Name:	SR 70 / SR 99						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	20	3090	600	180	2390	10	20	30	20	90	10	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	3090	600	180	2390	10	20	30	20	90	10	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	3090	600	180	2390	10	20	30	20	90	10	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	20	3090	600	180	2390	10	20	30	20	90	10	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	3090	600	180	2390	10	20	30	20	90	10	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	20	3090	600	180	2390	10	20	30	20	99	10	40
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.28	0.43	0.29	1.33	0.13	0.54
Final Sat.:	1500	3000	1500	1500	3000	1500	429	643	429	1993	201	805
Capacity Analysis Module:												
Vol/Sat:	0.01	1.03	0.40	0.12	0.80	0.01	0.05	0.05	0.05	0.05	0.05	0.05
Crit Volume:		1545		180			70			75		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 AM

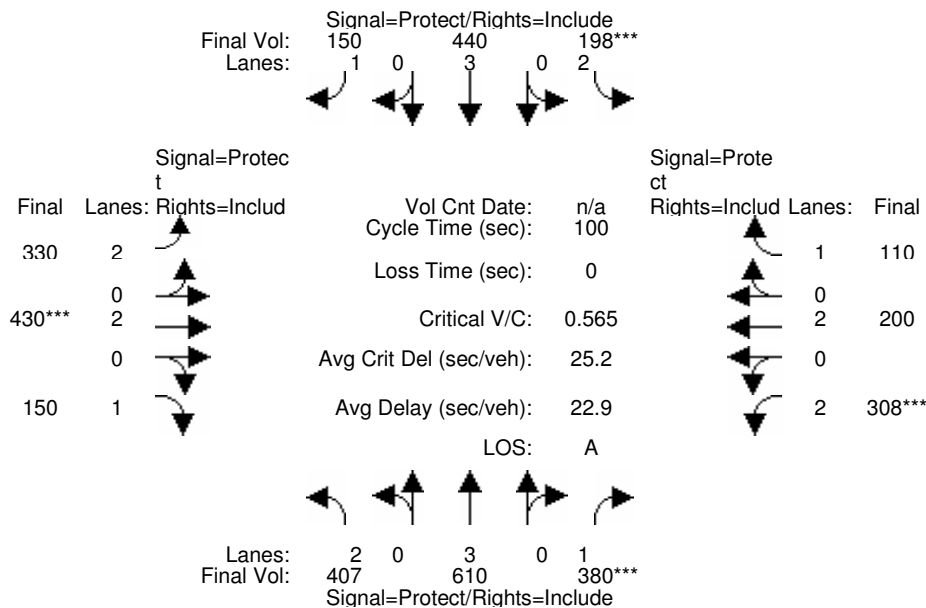
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	160	530	100	100	770	30	220	140	170	420	450	250
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	160	530	100	100	770	30	220	140	170	420	450	250
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	160	530	100	100	770	30	220	140	170	420	450	250
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	160	530	100	100	770	30	220	140	170	420	450	250
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	160	530	100	100	770	30	220	140	170	420	450	250
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	176	530	100	110	770	30	242	140	170	462	450	250
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.06	0.12	0.07	0.04	0.17	0.02	0.08	0.05	0.11	0.15	0.15	0.17
Crit Volume:	88			257			170	231				
Crit Moves:	****			****			****	****		****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 PM

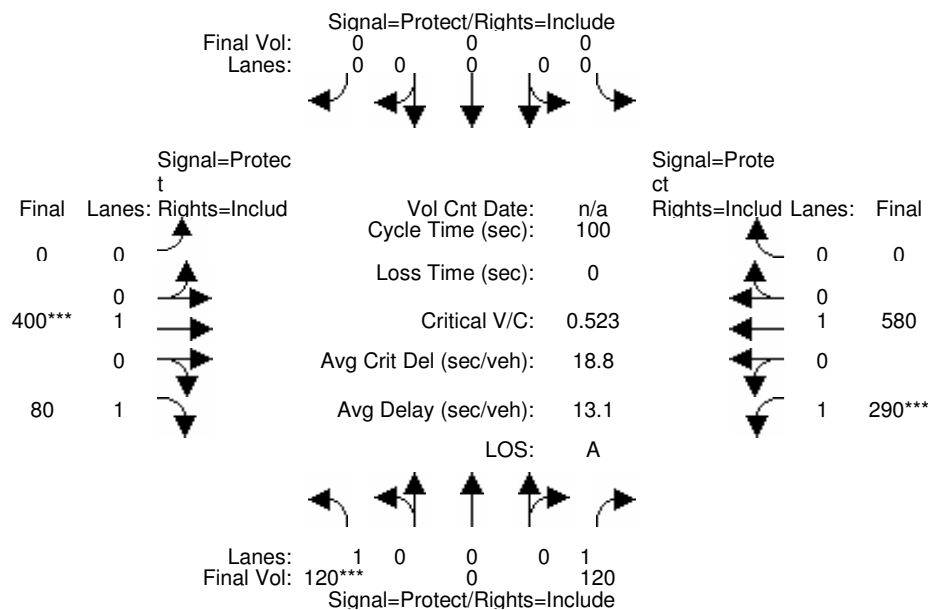
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue					Elverta Road						
	North Bound		South Bound			East Bound		West Bound				
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	370	610	380	180	440	150	300	430	150	280	200	110
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	370	610	380	180	440	150	300	430	150	280	200	110
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	370	610	380	180	440	150	300	430	150	280	200	110
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	370	610	380	180	440	150	300	430	150	280	200	110
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	370	610	380	180	440	150	300	430	150	280	200	110
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	407	610	380	198	440	150	330	430	150	308	200	110
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.14	0.14	0.25	0.07	0.10	0.10	0.11	0.14	0.10	0.10	0.07	0.07
Crit Volume:			380			99			215			154
Crit Moves:			***			***			***			***

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 AM

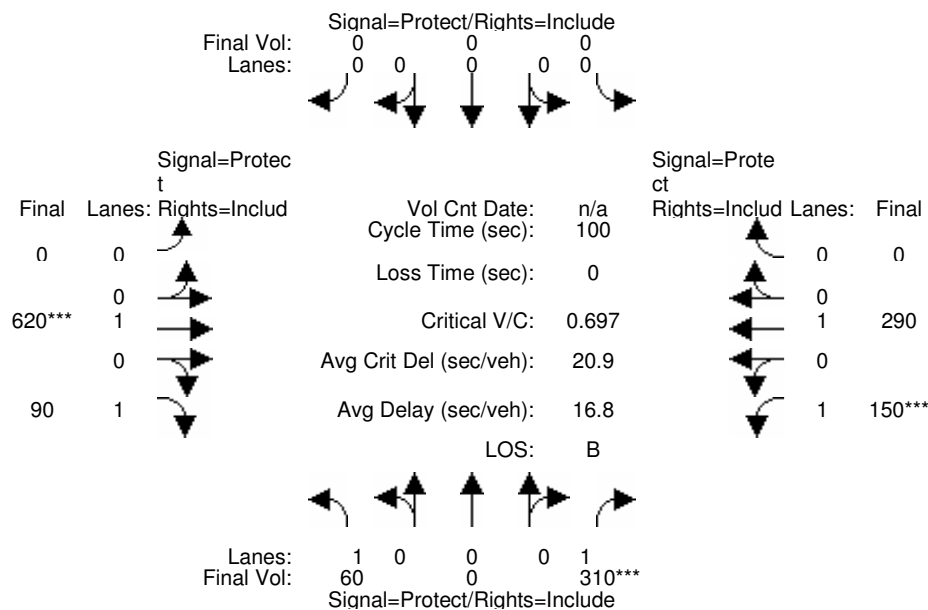
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	120	0	120	0	0	0	0	400	80	290	580	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	120	0	120	0	0	0	0	400	80	290	580	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	120	0	120	0	0	0	0	400	80	290	580	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	120	0	120	0	0	0	0	400	80	290	580	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	120	0	120	0	0	0	0	400	80	290	580	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	120	0	120	0	0	0	0	400	80	290	580	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	1550	1550	0
Capacity Analysis Module:												
Vol/Sat:	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.26	0.05	0.19	0.37	0.00
Crit Volume:	120							400		290		
Crit Moves:	****							****		****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 PM

Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	60	0	310	0	0	0	0	620	90	150	290	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	60	0	310	0	0	0	0	620	90	150	290	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	60	0	310	0	0	0	0	620	90	150	290	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	60	0	310	0	0	0	0	620	90	150	290	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	60	0	310	0	0	0	0	620	90	150	290	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	60	0	310	0	0	0	0	620	90	150	290	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	1550	1550	0
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.20	0.00	0.00	0.00	0.00	0.40	0.06	0.10	0.19	0.00
Crit Volume:			310	0				620		150		
Crit Moves:			***					***		***		

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3390 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 250 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3390	250	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	921	68	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4145	279	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 2417$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4424	7050	No
$v v$	1728 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2417	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.361
S
Space mean speed in ramp influence area, S = 56.7 mph
R
Space mean speed in outer lanes, S = 60.6 mph
O
Space mean speed for all vehicles, S = 58.2 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 22.8 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3640 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 989 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1484 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1484 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 63.6 mi/h
 Number of lanes, N 2
 Density, D 28.8 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2995 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 814 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1831 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1831 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.6 mi/h
 Number of lanes, N 2
 Density, D 25.9 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: Airport Blvd to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2965 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 806 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1676 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1676 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 5640 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 450 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5640	450	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1533	122	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 6376 501 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 3062$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	6376	9400	No
Fi F			
v = v - v	5875	9400	No
FO F R			
v	501	2100	No
R			
v v	1657 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3062	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 26.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.343$
S
Space mean speed in ramp influence area, $S = 57.1$ mph
R
Space mean speed in outer lanes, $S = 68.7$ mph
0
Space mean speed for all vehicles, $S = 62.6$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 17.1 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1820 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 495 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1113 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1113 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1820 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 290 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1820	290	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	495	79	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	2226		323		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2226$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2226	4700	No
Fi F			
$v = v - v$	1903	4700	No
FO F R			
v	323	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2226	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 21.6$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.327$
S
Space mean speed in ramp influence area, $S = 57.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.5$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1530 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 70 vph
Length of first accel/decel lane 650 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1530	70	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	416	19	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1871	78	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1871$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1949	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1871	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 16.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.316
S
Space mean speed in ramp influence area, S = 57.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1600 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 210 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1600	210	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	435	57	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1957	234	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1957$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2191	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1957	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.311
S
Space mean speed in ramp influence area, S = 57.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.8 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 17.0 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1810 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 492 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1107 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1107 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 20.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2160 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 587 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1321 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1321 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMo
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2160 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1290 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2160	1290	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	587	351	v
Trucks and buses	25	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2641	1416	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2641$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	2641	4700	No
Fi F			
v	2641	4400	No
12			
v = v - v	1225	4700	No
FO F R			
v	1416	2100	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 25.7$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.425$
S
Space mean speed in ramp influence area, $S = 55.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.2$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 870 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 40 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	870	40	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	236	11	v
Trucks and buses	25	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1064	44	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1064$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	1108	4700	No
FO			
v	1108	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.303
S
Space mean speed in ramp influence area, S = 58.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.0 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 8.6 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 910 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 247 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 556 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 556 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 8.6 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 920 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 250 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 562 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 562 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2270 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 617 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1283 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1283 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2200 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 598 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1243 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1243 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2200 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 230 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2200	230	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	598	62	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2487	252	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2487$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	2487	4700	No
Fi F			
v	2487	4400	No
12			
v = v - v	2235	4700	No
FO F R			
v	252	2100	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 24.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.321$
S
Space mean speed in ramp influence area, $S = 57.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Loop On
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1970 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 1470 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1970	1470	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	535	399	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2227	1614	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2227$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	3841	4700	No
FO			
v	3841	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.473
S
Space mean speed in ramp influence area, S = 54.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.1 mph

Average passenger-car speed, S 62.3 mi/h
 Number of lanes, N 2
 Density, D 31.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3440 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 935 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1944 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1944 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.2 mi/h
 Number of lanes, N 2
 Density, D 27.5 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3120 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 848 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1763 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1763 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3120 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 150 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3120	150	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	848	41	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3527	167	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3527$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3527	4700	No
Fi F			
$v = v - v$	3360	4700	No
FO F R			
v	167	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3527	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 31.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.313$
S
Space mean speed in ramp influence area, $S = 57.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2970 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 870 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2970	870	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	807	236	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3357	969	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3357$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4326	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3357	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.591
S
Space mean speed in ramp influence area, S = 51.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.4 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3840 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 10 vph
Length of first accel/decel lane 600 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3840	10	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1043	3	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4341	11	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4341 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4352	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4341	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.570
S
Space mean speed in ramp influence area, S = 51.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.9 mph

Average passenger-car speed, S 57.7 mi/h
 Number of lanes, N 2
 Density, D 37.7 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3850 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1046 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2176 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2176 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP1
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3850 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 870 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3850	870	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1046	236	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4352	955	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4352$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4352	4700	No
Fi F			
$v = v - v$	3397	4700	No
FO F R			
v	955	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4352	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.2$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.124$
S
Space mean speed in ramp influence area, $S = 62.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP1
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2125 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 870 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2125	870	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	577	236	v
Trucks and buses	25	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2599	955	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 2599$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3554	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2599	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.262
S
Space mean speed in ramp influence area, S = 59.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 59.0 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP1
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2965 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 305 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2965	305	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	806	83	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3352	335	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3352$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3352	4700	No
Fi F			
$v = v - v$	3017	4700	No
FO F R			
v	335	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3352	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 19.6$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.068$
S
Space mean speed in ramp influence area, $S = 63.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 63.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP1
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1515 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 305 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1515	305	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	412	83	v
Trucks and buses	25	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1853	335	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1853$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2188	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1853	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.161
S
Space mean speed in ramp influence area, S = 61.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 61.3 mph

Leisch Method for Weaving Analysis

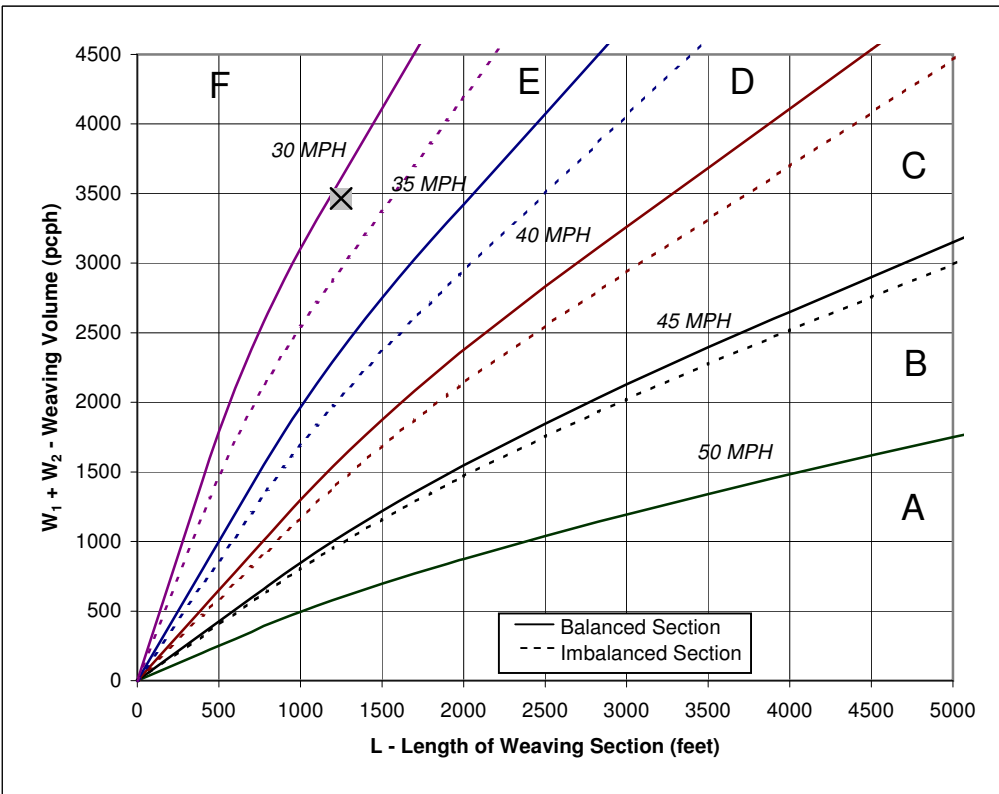
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

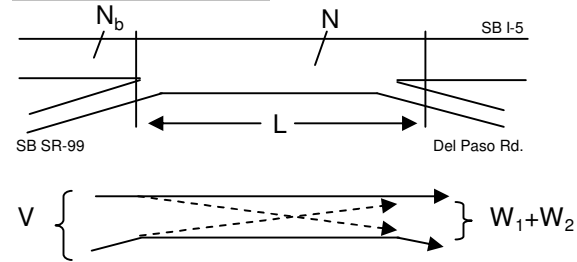
Project Information

Project	South Sutter County
Scenario	Existing PP1- AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,640	Volume (vph)*	2,980	Volume (vph)*	450
Truck Percentage	8%	Truck Percentage	2%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,866	Volume (pcph)	3,010	Volume (pcph)	455



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **27.3**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **1,694**
- Level of Service (LOS) **E**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	3640	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	3640	1515
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.8889
----------	--------

v_i	4451.087	pc/hr/ln
-------	----------	----------

Density, D	16.2	pc/mi/ln
-------------------	------	----------

LOS	B
------------	---

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Existing PP1 AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 5790 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 350 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5790	350	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1492	90	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6208	370	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 3620$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6578	7050	No
v/v	2588 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v/v > 2700$ pc/h?		No	
3 or av34			
Is $v/v > 1.5 v/2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3620	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.514
S
Space mean speed in ramp influence area, S = 53.2 mph
R
Space mean speed in outer lanes, S = 56.7 mph
O
Space mean speed for all vehicles, S = 54.5 mph

Average passenger-car speed, S 57.2 mi/h
 Number of lanes, N 3
 Density, D 38.3 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 6140 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1582 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2194 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2194 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.9 mi/h
 Number of lanes, N 2
 Density, D 24.8 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3005 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 774 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1611 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1611 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.7 mi/h
 Number of lanes, N 2
 Density, D 25.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3045 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 785 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1664 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1664 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 4400 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 490 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4400	490	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1134	126	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4808	518	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 2388$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4808	9400	No
Fi F			
v = v - v	4290	9400	No
FO F R			
v	518	2100	No
R			
v v	1210 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2388	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 20.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.345$
S
Space mean speed in ramp influence area, $S = 57.1$ mph
R
Space mean speed in outer lanes, $S = 70.5$ mph
0
Space mean speed for all vehicles, $S = 63.1$ mph

Average passenger-car speed, S 53.4 mi/h
 Number of lanes, N 2
 Density, D 43.3 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4320 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1113 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2316 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2316 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4320 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1120 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4320	1120	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1113	289	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4632	1184	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4632$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4632	4700	No
Fi F			
v = v - v	3448	4700	No
FO F R			
v	1184	2100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4632	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 42.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D = 0.405
S
Space mean speed in ramp influence area, S = 55.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3200 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 290 vph
Length of first accel/decel lane 650 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3200	290	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	825	75	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3431	306	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3431$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3737	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3431	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 30.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.452
S
Space mean speed in ramp influence area, S = 54.6 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.6 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3490 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 220 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3490	220	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	899	57	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3742	232	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3742$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3974	4700	No
v/v	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v/v > 2700$ pc/h?			No
3 or av34			
Is $v/v > 1.5 v/2$			No
3 or av34	12		
If yes, v =			(Equation 25-8)
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3742	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.483
S
Space mean speed in ramp influence area, S = 53.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 53.9 mph

Average passenger-car speed, S 61.6 mi/h
 Number of lanes, N 2
 Density, D 32.3 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3710 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 956 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1989 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1989 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 59.3 mi/h
 Number of lanes, N 2
 Density, D 35.6 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta to Riego
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3940 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1015 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2112 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2112 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMo
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3940 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1870 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	3940	1870	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1015	482	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4224	1947	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4224$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4224	4700	No
Fi F			
v	4224	4400	No
12			
v = v - v	2277	4700	No
FO F R			
v	1947	2100	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 39.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.473$
S
Space mean speed in ramp influence area, $S = 54.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.1$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2070 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 90 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2070	90	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	534	23	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2219	94	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2219$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2313	4700	No
FO			
v	2313	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.331
S
Space mean speed in ramp influence area, S = 57.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.4 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 17.8 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2160 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 557 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1158 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1158 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 18.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2190 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 564 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1174 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1174 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 8.3 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 990 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 255 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 541 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 541 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 8.3 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 990 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 255 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 541 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 541 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 990 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 120 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	990	120	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	255	31	v
Trucks and buses	12	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.943	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1082	125	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1082$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	1082	4700	No
Fi F			
v	1082	4400	No
12			
v = v - v	957	4700	No
FO F R			
v	125	2100	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 12.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.309$
S
Space mean speed in ramp influence area, $S = 57.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Loop On
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 870 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 2300 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	870	2300	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	224	593	v
Trucks and buses	12	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	951	2395	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 951$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	3346	4700	No
FO			
v	3346	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.402
S
Space mean speed in ramp influence area, S = 55.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.7 mph

Average passenger-car speed, S 64.4 mi/h
 Number of lanes, N 2
 Density, D 26.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3170 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 817 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1732 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1732 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 21.0 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2500 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 644 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1366 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1366 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2500 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 350 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2500	350	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	644	90	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	2732		370		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2732$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2732	4700	No
Fi F			
$v = v - v$	2362	4700	No
FO F R			
v	370	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2732	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 25.9$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.331$
S
Space mean speed in ramp influence area, $S = 57.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2150 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 360 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2150	360	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	554	93	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2349	380	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 2349$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2729	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2349	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.356
S
Space mean speed in ramp influence area, S = 56.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 56.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2510 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 30 vph
Length of first accel/decel lane 600 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2510	30	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	647	8	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2743	32	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 2743 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2775	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2743	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.3 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.330
S
Space mean speed in ramp influence area, S = 57.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.4 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 21.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Existing PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2540 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 655 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1388 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1388 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP1
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2540 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 482 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2540	482	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	655	124	v
Trucks and buses	12	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.990
Driver population factor, fP 1.00 1.00
Flow rate, vp 2776 502 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2776$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2776	4700	No
Fi F			
$v = v - v$	2274	4700	No
FO F R			
v	502	2200	No
R			
$v = v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2776	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 14.6$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.083$
S
Space mean speed in ramp influence area, $S = 63.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 63.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP1
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2523 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 482 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2523	482	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	650	124	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2705	502	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2705$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 3207 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2705	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.222
S
Space mean speed in ramp influence area, S = 59.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 59.9 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP1
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3045 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 703 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3045	703	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	785	181	v
Trucks and buses	12	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.990
Driver population factor, fP 1.00 1.00
Flow rate, vp 3328 732 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3328$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3328	4700	No
Fi F			
$v = v - v$	2596	4700	No
FO F R			
v	732	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3328	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 19.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.104$
S
Space mean speed in ramp influence area, $S = 62.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP1
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	3617 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	703 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	3617	703	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	932	181	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3878	732	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3878 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4610	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
	3 or av34		
Is v v	> 2700 pc/h?	No	
	3 or av34		
Is v v	> 1.5 v /2	No	
	3 or av34	12	
If yes, v =		(Equation 25-8)	
	12A		

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3878	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.518
S
Space mean speed in ramp influence area, S = 53.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 53.1 mph

Leisch Method for Weaving Analysis

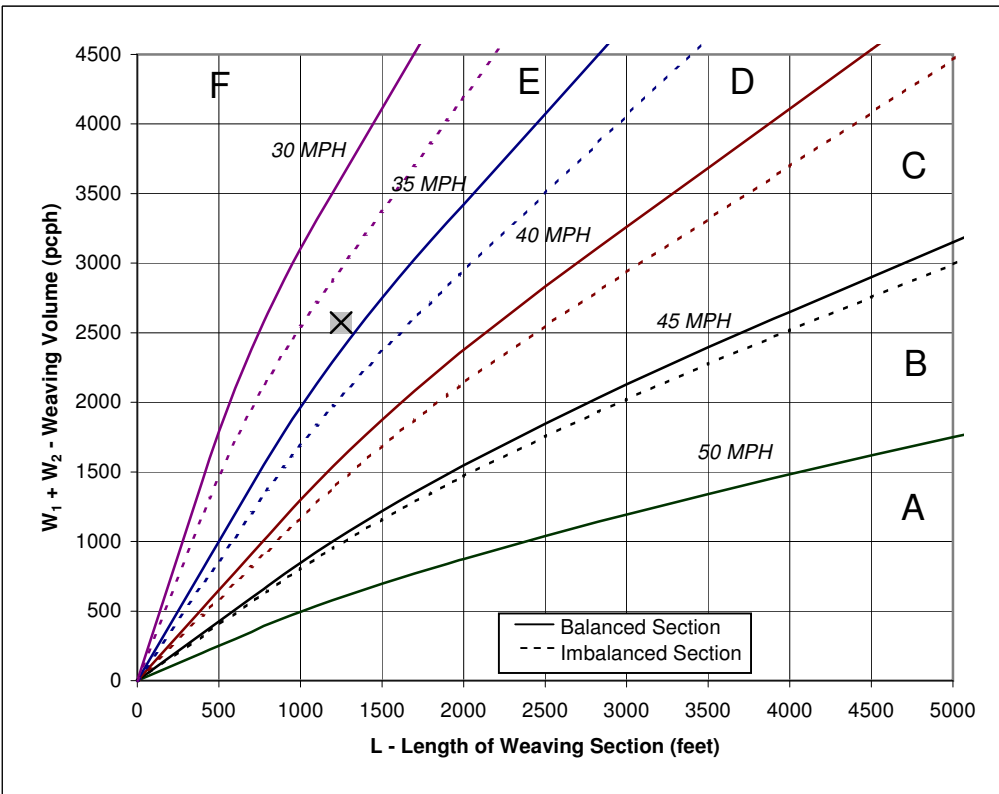
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

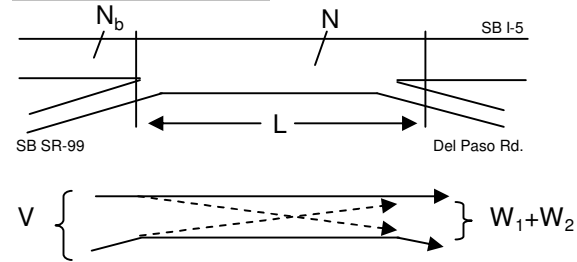
Project Information

Project	South Sutter County
Scenario	Existing PP1 - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	4,400	2,058	490
Truck Percentage	12%	2%	2%
PCE for Trucks	1.5	1.5	1.5
Volume (pcph)	4,664	2,079	495



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **32.1**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **1,413**
- Level of Service (LOS) **D**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	6140	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	6140	3617
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.9615
----------	--------

v_i	6583.093	pc/hr/ln
-------	----------	----------

Density, D	23.9	pc/mi/ln
-------------------	------	----------

LOS	C
------------	---

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Existing PP PM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



**EXISTING CONDITIONS
PLUS PROJECT**

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd

Sutter Pointe EIR
 Existing Plus Project AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	10	10	10	10	10	10
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)	11	11	11	11	11	11	11	11	11	11	11	11
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	92	82	16	92	82	16	22			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92	82	16	92	82	16	22			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	864	798	1063	864	798	1063	1594			1594		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	33	33	33	33								
Volume Left	11	11	11	11								
Volume Right	11	11	11	11								
cSH	895	895	1594	1594								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	1								
Control Delay (s)	9.2	9.2	2.5	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	2.5	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization			13.3%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99






























Sutter Pointe EIR
Existing Plus Project AM

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	
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583	
Volume (vph)	10	10	10	580	10	100	10	880	770	530	2120	10	
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)	11	11	11	630	11	109	11	957	837	576	2304	11	
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	11	12	0	630	11	109	11	957	837	576	2304	11	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%	
Turn Type	Prot			Prot		Free	Prot		Free	Prot		Free	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases						Free			Free			Free	
Actuated Green, G (s)	1.5	7.5		22.2	28.2	135.2	1.5	51.1	135.2	38.4	88.0	135.2	
Effective Green, g (s)	1.5	7.5		22.2	28.2	135.2	1.5	51.1	135.2	38.4	88.0	135.2	
Actuated g/C Ratio	0.01	0.06		0.16	0.21	1.00	0.01	0.38	1.00	0.28	0.65	1.00	
Clearance Time (s)	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		
Lane Grp Cap (vph)	20	96		564	389	1583	20	1092	1583	503	2176	1583	
v/s Ratio Prot	0.01	0.01		c0.18	0.01		0.01	0.33		c0.33	c0.69		
v/s Ratio Perm						0.07			c0.53			0.01	
v/c Ratio	0.55	0.12		1.12	0.03	0.07	0.55	0.88	0.53	1.15	1.06	0.01	
Uniform Delay, d1	66.5	60.7		56.5	42.6	0.0	66.5	39.1	0.0	48.4	23.6	0.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	28.9	0.6		74.3	0.0	0.1	28.9	8.1	1.3	86.6	37.1	0.0	
Delay (s)	95.4	61.3		130.8	42.6	0.1	95.4	47.2	1.3	135.0	60.7	0.0	
Level of Service	F	E		F	D	A	F	D	A	F	E	A	
Approach Delay (s)		72.7			110.5			26.2			75.3		
Approach LOS		E			F			C			E		
Intersection Summary													
HCM Average Control Delay			63.9									HCM Level of Service	E
HCM Volume to Capacity ratio			1.03										
Actuated Cycle Length (s)			135.2									Sum of lost time (s)	8.0
Intersection Capacity Utilization			95.1%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group





















HCM Signalized Intersection Capacity Analysis
3: Sankey Rd & Road "H"

Sutter Pointe EIR
Existing Plus Project AM

												
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	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	660	350	300	50	180	140	130	290	10	30	170	370
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)	717	380	326	54	196	152	141	315	11	33	185	402
RTOR Reduction (vph)	0	0	206	0	0	126	0	0	8	0	0	309
Lane Group Flow (vph)	717	380	120	54	196	26	141	315	3	33	185	93
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6			4			8
Actuated Green, G (s)	16.4	24.5	24.5	3.4	11.5	11.5	7.2	20.8	20.8	1.7	15.3	15.3
Effective Green, g (s)	16.4	24.5	24.5	3.4	11.5	11.5	7.2	20.8	20.8	1.7	15.3	15.3
Actuated g/C Ratio	0.25	0.37	0.37	0.05	0.17	0.17	0.11	0.31	0.31	0.03	0.23	0.23
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)	848	1306	584	91	613	274	192	584	496	45	429	365
v/s Ratio Prot	c0.21	c0.11		0.03	0.06		c0.08	c0.17		0.02	0.10	
v/s Ratio Perm			0.08			0.02			0.00			0.06
v/c Ratio	0.85	0.29	0.21	0.59	0.32	0.10	0.73	0.54	0.01	0.73	0.43	0.25
Uniform Delay, d1	23.8	14.8	14.3	30.8	24.0	23.1	28.7	18.8	15.7	32.1	21.8	20.9
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	7.8	0.1	0.2	10.0	0.3	0.2	13.5	1.0	0.0	46.2	0.7	0.4
Delay (s)	31.6	14.9	14.5	40.8	24.3	23.2	42.2	19.8	15.7	78.3	22.5	21.3
Level of Service	C	B	B	D	C	C	D	B	B	E	C	C
Approach Delay (s)		23.2			26.1			26.5			24.7	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			24.4				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			66.4				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			55.7%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												


































HCM Signalized Intersection Capacity Analysis
4: Riego Rd & Power Line Rd

Sutter Pointe EIR
Existing Plus Project AM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.85		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1820		1770	1723		1770	1591		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1820		1770	1723		1770	1591		1770	1723	
Volume (vph)	10	220	40	90	10	10	10	10	360	10	10	10
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)	11	239	43	98	11	11	11	11	391	11	11	11
RTOR Reduction (vph)	0	11	0	0	8	0	0	271	0	0	8	0
Lane Group Flow (vph)	11	271	0	98	14	0	11	131	0	11	14	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.5	11.0		3.8	14.3		0.5	13.9		0.5	13.9	
Effective Green, g (s)	0.5	11.0		3.8	14.3		0.5	13.9		0.5	13.9	
Actuated g/C Ratio	0.01	0.24		0.08	0.32		0.01	0.31		0.01	0.31	
Clearance Time (s)	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	
Lane Grp Cap (vph)	20	443		149	545		20	489		20	530	
v/s Ratio Prot	0.01	c0.15		c0.06	c0.01		c0.01	c0.08		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.55	0.61		0.66	0.03		0.55	0.27		0.55	0.03	
Uniform Delay, d1	22.2	15.2		20.1	10.7		22.2	11.8		22.2	10.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.9	2.5		10.0	0.0		28.9	0.3		28.9	0.0	
Delay (s)	51.1	17.7		30.1	10.7		51.1	12.1		51.1	10.9	
Level of Service	D	B		C	B		D	B		D	B	
Approach Delay (s)		18.9			26.5			13.1			24.3	
Approach LOS		B			C			B			C	
Intersection Summary												
HCM Average Control Delay			17.4			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			45.2			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			51.8%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Pointe EIR
Existing Plus Project AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	10	600	700	880	1410	40	980	1610	1020	160	1540	1010
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)	11	652	761	957	1533	43	1065	1750	1109	174	1674	1098
RTOR Reduction (vph)	0	0	367	0	0	18	0	0	0	0	0	0
Lane Group Flow (vph)	11	652	394	957	1533	25	1065	1750	1109	174	1674	1098
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	1.6	25.4	25.4	24.0	47.8	47.8	49.0	87.0	162.4	10.0	48.0	162.4
Effective Green, g (s)	1.6	25.4	25.4	24.0	47.8	47.8	49.0	87.0	162.4	10.0	48.0	162.4
Actuated g/C Ratio	0.01	0.16	0.16	0.15	0.29	0.29	0.30	0.54	1.00	0.06	0.30	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	34	795	248	507	1497	466	534	1547	1583	109	988	1583
v/s Ratio Prot	0.00	0.13		c0.28	0.30		c0.60	0.61		0.10	c0.50	
v/s Ratio Perm			c0.25			0.02			0.70			0.69
v/c Ratio	0.32	0.82	1.59	1.89	1.02	0.05	1.99	1.13	0.70	1.60	1.69	0.69
Uniform Delay, d1	79.9	66.3	68.5	69.2	57.3	41.1	56.7	37.7	0.0	76.2	57.2	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	6.8	283.3	406.8	29.6	0.0	454.1	67.8	2.6	307.0	316.8	2.5
Delay (s)	85.3	73.1	351.8	476.0	86.9	41.1	510.8	105.5	2.6	383.2	374.0	2.5
Level of Service	F	E	F	F	F	D	F	F	A	F	F	A
Approach Delay (s)		222.1			233.1			186.4			236.1	
Approach LOS		F			F			F			F	




































Intersection Summary

HCM Average Control Delay	215.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.81		
Actuated Cycle Length (s)	162.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	146.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group













HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

Sutter Pointe EIR
Existing Plus Project AM

												
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	0.97	0.86	1.00	0.97	0.86	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	530	970	10	10	1940	310	60	30	10	250	10	320
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)	576	1054	11	11	2109	337	65	33	11	272	11	348
RTOR Reduction (vph)	0	0	5	0	0	184	0	0	9	0	0	199
Lane Group Flow (vph)	576	1054	6	11	2109	153	65	33	2	272	11	149
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	19.0	60.5	60.5	0.8	42.3	42.3	3.9	18.9	18.9	21.9	36.9	36.9
Effective Green, g (s)	19.0	60.5	60.5	0.8	42.3	42.3	3.9	18.9	18.9	21.9	36.9	36.9
Actuated g/C Ratio	0.16	0.51	0.51	0.01	0.36	0.36	0.03	0.16	0.16	0.19	0.31	0.31
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)	552	3283	811	23	2295	567	113	566	253	637	1106	495
v/s Ratio Prot	c0.17	0.16		0.00	c0.33		0.02	0.01		c0.08	0.00	
v/s Ratio Perm			0.00			0.10			0.00			c0.09
v/c Ratio	1.04	0.32	0.01	0.48	0.92	0.27	0.58	0.06	0.01	0.43	0.01	0.30
Uniform Delay, d1	49.5	16.8	14.1	58.4	36.3	26.9	56.3	42.1	41.7	42.5	28.0	30.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	50.1	0.3	0.0	14.8	7.4	1.2	6.9	0.0	0.0	2.1	0.0	1.6
Delay (s)	99.7	17.1	14.1	73.3	43.7	28.1	63.2	42.1	41.7	44.6	28.0	32.4
Level of Service	F	B	B	E	D	C	E	D	D	D	C	C
Approach Delay (s)		46.0			41.7			54.6			37.6	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			42.9	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			118.1	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			67.0%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Pointe EIR
Existing Plus Project AM

												
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		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1583	1770	3539		1770		1583			
Flt Permitted		1.00	1.00	0.27	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1583	506	3539		1770		1583			
Volume (vph)	0	690	10	40	1260	0	730	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)	0	750	11	43	1370	0	793	0	22	0	0	0
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	12	0	0	0
Lane Group Flow (vph)	0	750	5	43	1370	0	793	0	10	0	0	0
Turn Type			Perm	Perm			custom		custom			
Protected Phases		4			8							
Permitted Phases			4	8			2		2			
Actuated Green, G (s)		29.7	29.7	29.7	29.7		33.7		33.7			
Effective Green, g (s)		29.7	29.7	29.7	29.7		33.7		33.7			
Actuated g/C Ratio		0.42	0.42	0.42	0.42		0.47		0.47			
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)		1472	658	210	1472		835		747			
v/s Ratio Prot		0.21			c0.39							
v/s Ratio Perm			0.00	0.08			c0.45		0.01			
v/c Ratio		0.51	0.01	0.20	0.93		0.95		0.01			
Uniform Delay, d1		15.5	12.2	13.3	19.9		18.0		10.0			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.3	0.0	0.5	10.8		19.7		0.0			
Delay (s)		15.7	12.2	13.8	30.7		37.7		10.0			
Level of Service		B	B	B	C		D		B			
Approach Delay (s)		15.7			30.2			37.0			0.0	
Approach LOS		B			C			D			A	
Intersection Summary												
HCM Average Control Delay			28.3				HCM Level of Service		C			
HCM Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			71.4				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			81.9%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Existing Plus Project AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↗	↗
Sign Control		Stop	Stop		Stop	
Volume (vph)	10	700	1220	80	70	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	761	1326	87	76	87
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	772	1326	87	163		
Volume Left (vph)	11	0	0	76		
Volume Right (vph)	0	0	87	87		
Hadj (s)	0.04	0.03	-0.67	-0.19		
Departure Headway (s)	5.5	5.8	5.1	6.8		
Degree Utilization, x	1.19	2.15	0.12	0.31		
Capacity (veh/h)	647	629	693	525		
Control Delay (s)	118.8	534.0	7.6	12.8		
Approach Delay (s)	118.8	501.6		12.8		
Approach LOS	F	F		B		
Intersection Summary						
Delay			341.8			
HCM Level of Service			F			
Intersection Capacity Utilization			79.7%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Existing Plus Project AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	↖
Sign Control	Stop			Stop	Stop	
Volume (vph)	600	170	70	850	450	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	652	185	76	924	489	22
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	652	185	1000	511		
Volume Left (vph)	0	0	76	489		
Volume Right (vph)	0	185	0	22		
Hadj (s)	0.03	-0.67	0.05	0.20		
Departure Headway (s)	7.6	6.9	7.1	7.2		
Degree Utilization, x	1.38	0.36	1.98	1.02		
Capacity (veh/h)	484	515	514	511		
Control Delay (s)	204.6	12.5	463.8	71.4		
Approach Delay (s)	162.2		463.8	71.4		
Approach LOS	F		F	F		
Intersection Summary						
Delay			270.9			
HCM Level of Service			F			
Intersection Capacity Utilization			116.3%	ICU Level of Service	H	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Existing Plus Project AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	600	10	90	890	130	20	110	40	30	10	10
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)	11	652	11	98	967	141	22	120	43	33	11	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	674	1207	185	54
Volume Left (vph)	11	98	22	33
Volume Right (vph)	11	141	43	11
Hadj (s)	0.03	-0.02	-0.08	0.03
Departure Headway (s)	5.9	5.8	7.2	8.0
Degree Utilization, x	1.10	1.95	0.37	0.12
Capacity (veh/h)	609	628	491	429
Control Delay (s)	88.7	447.1	14.4	12.1
Approach Delay (s)	88.7	447.1	14.4	12.1
Approach LOS	F	F	B	B

Intersection Summary			
Delay		284.3	
HCM Level of Service		F	
Intersection Capacity Utilization	112.1%		ICU Level of Service H
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Pointe EIR
 Existing Plus Project AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	610	1100	10	20	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	663	1196	11	22	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	1207				1886	1201
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1207				1886	1201
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				71	95
cM capacity (veh/h)	578				76	225

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	674	1207	33
Volume Left	11	0	22
Volume Right	0	11	11
cSH	578	1700	98
Volume to Capacity	0.02	0.71	0.33
Queue Length 95th (ft)	1	0	32
Control Delay (s)	0.5	0.0	59.3
Lane LOS	A		F
Approach Delay (s)	0.5	0.0	59.3
Approach LOS			F

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

Sutter Pointe EIR
 Existing Plus Project AM

	→	↘	↙	←	↖	↗
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)	500	140	410	840	270	230
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	543	152	446	913	293	250
RTOR Reduction (vph)	0	97	0	0	0	94
Lane Group Flow (vph)	543	55	446	913	293	156
Turn Type		Perm	Prot			pm+ov
Protected Phases	2		1	6	4	1
Permitted Phases		2				4
Actuated Green, G (s)	25.2	25.2	21.7	50.5	14.6	36.3
Effective Green, g (s)	27.2	27.2	21.3	52.5	14.9	36.2
Actuated g/C Ratio	0.36	0.36	0.28	0.70	0.20	0.48
Clearance Time (s)	6.0	6.0	3.6	6.0	4.3	3.6
Vehicle Extension (s)	2.0	2.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)	672	571	500	1297	350	844
v/s Ratio Prot	c0.29		c0.25	0.49	c0.17	0.05
v/s Ratio Perm		0.03				0.05
v/c Ratio	0.81	0.10	0.89	0.70	0.84	0.18
Uniform Delay, d1	21.7	16.0	25.9	6.8	29.1	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.7	0.0	17.5	1.4	15.2	0.0
Delay (s)	28.4	16.0	43.5	8.3	44.3	11.2
Level of Service	C	B	D	A	D	B
Approach Delay (s)	25.7			19.8	29.1	
Approach LOS	C			B	C	
Intersection Summary						
HCM Average Control Delay			23.3		HCM Level of Service	C
HCM Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			75.4		Sum of lost time (s)	12.0
Intersection Capacity Utilization			74.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Existing Plus Project AM

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
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3471		1770	3539	1583	1770	3539	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3471		1770	3539	1583	1770	3539	1583	1770	1863	1583
Volume (vph)	300	270	40	270	630	80	20	510	280	40	400	640
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)	326	293	43	293	685	87	22	554	304	43	435	696
RTOR Reduction (vph)	0	15	0	0	0	63	0	0	214	0	0	324
Lane Group Flow (vph)	326	321	0	293	685	24	22	554	90	43	435	372
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases						6			4			8
Actuated Green, G (s)	15.1	20.8		13.8	19.5	19.5	1.1	21.0	21.0	1.7	21.6	21.6
Effective Green, g (s)	15.1	22.8		13.8	21.5	21.5	1.1	23.0	23.0	1.7	23.6	23.6
Actuated g/C Ratio	0.20	0.29		0.18	0.28	0.28	0.01	0.30	0.30	0.02	0.31	0.31
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	2.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	346	1024		316	984	440	25	1053	471	39	569	483
v/s Ratio Prot	c0.18	0.09		0.17	c0.19		0.01	0.16		c0.02	0.23	
v/s Ratio Perm						0.02			0.06			c0.23
v/c Ratio	0.94	0.31		0.93	0.70	0.05	0.88	0.53	0.19	1.10	0.76	0.77
Uniform Delay, d1	30.7	21.2		31.3	25.0	20.5	38.0	22.6	20.2	37.8	24.3	24.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.2	0.3		31.6	2.6	0.1	124.9	0.8	0.4	176.2	7.0	8.3
Delay (s)	63.9	21.5		62.9	27.6	20.6	163.0	23.5	20.6	214.0	31.3	32.7
Level of Service	E	C		E	C	C	F	C	C	F	C	C
Approach Delay (s)		42.4			36.7			26.0			38.8	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay			35.9	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			77.3	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			71.8%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												






















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Existing Plus Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	10	30	60	750	20	80	10	210	40	10
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)	11	22	11	33	65	815	22	87	11	228	43	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	43	913	120	283								
Volume Left (vph)	11	33	22	228								
Volume Right (vph)	11	815	11	11								
Hadj (s)	-0.07	-0.49	0.02	0.17								
Departure Headway (s)	6.3	4.8	6.5	6.3								
Degree Utilization, x	0.08	1.22	0.22	0.50								
Capacity (veh/h)	527	744	533	558								
Control Delay (s)	9.8	128.0	11.3	15.4								
Approach Delay (s)	9.8	128.0	11.3	15.4								
Approach LOS	A	F	B	C								
Intersection Summary												
Delay			90.5									
HCM Level of Service			F									
Intersection Capacity Utilization			80.4%	ICU Level of Service	D							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 15: Elverta Rd & Hwy 99

Sutter Pointe EIR
 Existing Plus Project AM

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.88		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1641		1681	1687		1770	2888	1583	1770	3343	1583
Flt Permitted		1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1641		1681	1687		1770	2888	1583	1770	3343	1583
Volume (vph)	10	20	200	430	90	40	650	2950	80	70	2590	30
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)	11	22	217	467	98	43	707	3207	87	76	2815	33
RTOR Reduction (vph)	0	163	0	0	4	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	87	0	301	303	0	707	3207	87	76	2815	33
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Split		Prot		Free		Prot		Free	
Protected Phases	4	4		8	8		5	2		1		6
Permitted Phases										Free		Free
Actuated Green, G (s)		11.8		23.0	23.0		28.0	91.1	145.9	4.0	67.1	145.9
Effective Green, g (s)		11.8		23.0	23.0		28.0	91.1	145.9	4.0	67.1	145.9
Actuated g/C Ratio		0.08		0.16	0.16		0.19	0.62	1.00	0.03	0.46	1.00
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		133		265	266		340	1803	1583	49	1537	1583
v/s Ratio Prot		c0.05		0.18	c0.18		c0.40	c1.11		0.04	0.84	
v/s Ratio Perm									0.05			0.02
v/c Ratio		0.66		1.14	1.14		2.08	1.78	0.05	1.55	1.83	0.02
Uniform Delay, d1		65.1		61.5	61.5		59.0	27.4	0.0	71.0	39.4	0.0
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		11.1		96.9	97.7		495.7	352.7	0.1	326.5	376.7	0.0
Delay (s)		76.2		158.4	159.2		554.7	380.1	0.1	397.4	416.1	0.0
Level of Service		E		F	F		F	F	A	F	F	A
Approach Delay (s)		76.2			158.8			402.7			411.0	
Approach LOS		E			F			F			F	
Intersection Summary												
HCM Average Control Delay		376.2		HCM Level of Service				F				
HCM Volume to Capacity ratio		1.61										
Actuated Cycle Length (s)		145.9		Sum of lost time (s)				12.0				
Intersection Capacity Utilization		150.4%		ICU Level of Service				H				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

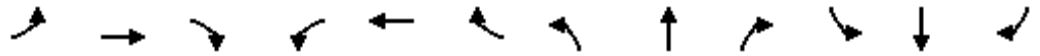
Sutter Pointe EIR
 Existing Plus Project AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	140	10	120	460	480	10	260	50	10	40	20
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)	11	152	11	130	500	522	11	283	54	11	43	22
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	174	1152	348	76								
Volume Left (vph)	11	130	11	11								
Volume Right (vph)	11	522	54	22								
Hadj (s)	0.01	-0.22	-0.05	-0.11								
Departure Headway (s)	6.5	5.5	6.3	7.0								
Degree Utilization, x	0.31	1.76	0.61	0.15								
Capacity (veh/h)	522	665	550	471								
Control Delay (s)	12.4	361.0	18.8	11.3								
Approach Delay (s)	12.4	361.0	18.8	11.3								
Approach LOS	B	F	C	B								
Intersection Summary												
Delay			243.1									
HCM Level of Service			F									
Intersection Capacity Utilization			97.1%	ICU Level of Service	F							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Pointe EIR
 Existing Plus Project AM



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)	40	160	0	0	990	10	0	0	0	110	0	70
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)	43	174	0	0	1076	11	0	0	0	120	0	76
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	1087			174			1413	1348	174	1342	1342	1082
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1087			174			1413	1348	174	1342	1342	1082
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 %	93			100			100	100	100	2	100	71
cM capacity (veh/h)	642			1403			78	141	870	122	142	265

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	217	0	1087	0	196
Volume Left	43	0	0	0	120
Volume Right	0	0	11	0	76
cSH	642	1700	1700	1700	155
Volume to Capacity	0.07	0.00	0.64	0.00	1.26
Queue Length 95th (ft)	5	0	0	0	287
Control Delay (s)	2.9	0.0	0.0	0.0	217.1
Lane LOS	A			A	F
Approach Delay (s)	2.9	0.0		0.0	217.1
Approach LOS				A	F

Intersection Summary				
Average Delay		28.7		
Intersection Capacity Utilization	69.8%		ICU Level of Service	C
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

Sutter Pointe EIR
 Existing Plus Project AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	240	540	20	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	261	587	22	11	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	609				880	598
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	609				880	598
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	98
cM capacity (veh/h)	970				314	502
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	272	609	22			
Volume Left	11	0	11			
Volume Right	0	22	11			
cSH	970	1700	386			
Volume to Capacity	0.01	0.36	0.06			
Queue Length 95th (ft)	1	0	4			
Control Delay (s)	0.5	0.0	14.9			
Lane LOS	A		B			
Approach Delay (s)	0.5	0.0	14.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization		39.6%		ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

Sutter Pointe EIR
 Existing Plus Project AM



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)	10	230	10	100	490	10	10	20	50	20	40	70
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)	11	250	11	109	533	11	11	22	54	22	43	76
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	543			261			1130	1038	255	1098	1038	538
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	543			261			1130	1038	255	1098	1038	538
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 %	99			92			91	90	93	86	79	86
cM capacity (veh/h)	1025			1304			122	209	783	152	209	543
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	272	652	87	141								
Volume Left	11	109	11	22								
Volume Right	11	11	54	76								
cSH	1025	1304	331	288								
Volume to Capacity	0.01	0.08	0.26	0.49								
Queue Length 95th (ft)	1	7	26	64								
Control Delay (s)	0.4	2.2	19.7	29.0								
Lane LOS	A	A	C	D								
Approach Delay (s)	0.4	2.2	19.7	29.0								
Approach LOS			C	D								
Intersection Summary												
Average Delay			6.4									
Intersection Capacity Utilization			65.9%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Existing Plus Project AM















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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	220	140	190	410	450	230	160	580	100	110	780	260
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)	239	152	207	446	489	250	174	630	109	120	848	283
RTOR Reduction (vph)	0	0	82	0	0	122	0	0	67	0	0	181
Lane Group Flow (vph)	239	152	125	446	489	128	174	630	42	120	848	102
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	6.2	21.0	21.0	5.6	20.7	20.7	4.4	29.5	29.5	2.3	27.4	27.4
Effective Green, g (s)	7.7	22.7	22.7	7.1	22.1	22.1	5.9	31.2	31.2	3.8	29.1	29.1
Actuated g/C Ratio	0.10	0.28	0.28	0.09	0.27	0.27	0.07	0.39	0.39	0.05	0.36	0.36
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	327	994	445	302	968	433	251	1964	611	161	1831	570
v/s Ratio Prot	0.07	0.04		c0.13	c0.14		c0.05	0.12		0.03	c0.17	
v/s Ratio Perm			0.08			0.08			0.03			0.06
v/c Ratio	0.73	0.15	0.28	1.48	0.51	0.30	0.69	0.32	0.07	0.75	0.46	0.18
Uniform Delay, d1	35.5	21.8	22.7	36.9	24.7	23.2	36.6	17.4	15.6	38.0	19.9	17.7
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	7.1	0.2	1.0	231.7	0.9	0.8	6.5	0.2	0.1	15.0	0.4	0.4
Delay (s)	42.6	22.0	23.6	268.5	25.6	24.0	43.1	17.6	15.8	53.1	20.3	18.0
Level of Service	D	C	C	F	C	C	D	B	B	D	C	B
Approach Delay (s)		30.8			116.7			22.2			22.9	
Approach LOS		C			F			C			C	

Intersection Summary

HCM Average Control Delay	52.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			













HCM Unsignalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Existing Plus Project AM

												
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	90	10	0	80	870	0	0	0	160	0	10
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	98	11	0	87	946	0	0	0	174	0	11
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	87			98			196	185	98	185	185	87
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	87			98			196	185	98	185	185	87
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			100			100	100	100	78	100	99
cM capacity (veh/h)	1509			1495			755	710	958	776	710	972
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2						
Volume Total	98	11	87	946	174	11						
Volume Left	0	0	0	0	174	0						
Volume Right	0	11	0	946	0	11						
cSH	1700	1700	1700	1700	776	972						
Volume to Capacity	0.06	0.01	0.05	0.56	0.22	0.01						
Queue Length 95th (ft)	0	0	0	0	21	1						
Control Delay (s)	0.0	0.0	0.0	0.0	11.0	8.7						
Lane LOS					B	A						
Approach Delay (s)	0.0		0.0		10.8							
Approach LOS					B							
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			57.2%		ICU Level of Service		B					
Analysis Period (min)			15									













HCM Unsignalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
 Existing Plus Project AM

												
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	160	90	0	890	330	60	0	280	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	174	98	0	967	359	65	0	304	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)												
pX, platoon unblocked												
vC, conflicting volume	967			174			1141	1141	174	1446	1141	967
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	967			174			1141	1141	174	1446	1141	967
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			100			63	100	65	100	100	100
cM capacity (veh/h)	712			1403			178	201	870	71	201	308
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	174	98	967	359	65	304						
Volume Left	0	0	0	0	65	0						
Volume Right	0	98	0	359	0	304						
cSH	1700	1700	1700	1700	178	870						
Volume to Capacity	0.10	0.06	0.57	0.21	0.37	0.35						
Queue Length 95th (ft)	0	0	0	0	39	40						
Control Delay (s)	0.0	0.0	0.0	0.0	36.6	11.4						
Lane LOS					E	B						
Approach Delay (s)	0.0		0.0		15.8							
Approach LOS					C							
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			56.8%		ICU Level of Service		B					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
Existing Plus Project AM

												
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	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)	0	400	80	290	580	0	140	0	150	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)	0	435	87	315	630	0	152	0	163	0	0	0
RTOR Reduction (vph)	0	0	56	0	0	0	0	0	138	0	0	0
Lane Group Flow (vph)	0	435	31	315	630	0	152	0	25	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		16.4	16.4	13.3	33.2		8.4		8.4			
Effective Green, g (s)		17.9	17.9	12.8	34.7		7.9		7.9			
Actuated g/C Ratio		0.35	0.35	0.25	0.69		0.16		0.16			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		659	560	448	1278		276		247			
v/s Ratio Prot		c0.23		c0.18	0.34		c0.09					
v/s Ratio Perm			0.02						0.02			
v/c Ratio		0.66	0.05	0.70	0.49		0.55		0.10			
Uniform Delay, d1		13.8	10.8	17.2	3.8		19.7		18.3			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		2.5	0.0	4.1	0.3		1.4		0.1			
Delay (s)		16.3	10.8	21.2	4.1		21.1		18.4			
Level of Service		B	B	C	A		C		B			
Approach Delay (s)		15.4			9.8			19.7			0.0	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM Average Control Delay			13.2				HCM Level of Service		B			
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			50.6				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												

HCM Unsignalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
 Existing Plus Project AM

























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	100	580	700	190	30	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	630	761	207	33	141
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	967				1712	864
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	967				1712	864
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				61	60
cM capacity (veh/h)	712				84	354

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	739	967	33	141
Volume Left	109	0	33	0
Volume Right	0	207	0	141
cSH	712	1700	84	354
Volume to Capacity	0.15	0.57	0.39	0.40
Queue Length 95th (ft)	13	0	38	47
Control Delay (s)	3.9	0.0	72.4	21.8
Lane LOS	A		F	C
Approach Delay (s)	3.9	0.0	31.3	
Approach LOS			D	

Intersection Summary			
Average Delay		4.4	
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
45: Riego Rd & Road "U"

Sutter Pointe EIR
Existing Plus Project AM

												
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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3512		1770	3539	1583	1770	1863	1583	1770	1676	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3512		1770	3539	1583	1770	1863	1583	1770	1676	
Volume (vph)	140	380	20	410	260	270	10	10	120	110	10	20
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)	152	413	22	446	283	293	11	11	130	120	11	22
RTOR Reduction (vph)	0	3	0	0	0	148	0	0	114	0	18	0
Lane Group Flow (vph)	152	432	0	446	283	145	11	11	16	120	15	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6			4			
Actuated Green, G (s)	9.9	27.2		25.3	42.6	42.6	0.7	10.6	10.6	7.1	17.0	
Effective Green, g (s)	9.9	27.2		25.3	42.6	42.6	0.7	10.6	10.6	7.1	17.0	
Actuated g/C Ratio	0.11	0.32		0.29	0.49	0.49	0.01	0.12	0.12	0.08	0.20	
Clearance Time (s)	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	
Lane Grp Cap (vph)	203	1108		520	1749	782	14	229	195	146	331	
v/s Ratio Prot	0.09	c0.12		c0.25	0.08		0.01	0.01		c0.07	0.01	
v/s Ratio Perm						0.09			c0.01			
v/c Ratio	0.75	0.39		0.86	0.16	0.19	0.79	0.05	0.08	0.82	0.05	
Uniform Delay, d1	36.9	23.0		28.8	12.0	12.1	42.7	33.3	33.5	38.9	28.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	14.0	1.0		13.2	0.2	0.5	130.6	0.1	0.2	29.6	0.1	
Delay (s)	51.0	24.1		41.9	12.2	12.7	173.2	33.4	33.7	68.5	28.1	
Level of Service	D	C		D	B	B	F	C	C	E	C	
Approach Delay (s)		31.0			25.3			43.8			59.8	
Approach LOS		C			C			D			E	
Intersection Summary												
HCM Average Control Delay			31.3				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			86.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			56.6%				ICU Level of Service			B		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Pointe EIR
Existing Plus Project AM



































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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Volume (vph)	90	480	40	10	1030	230	10	10	10	10	10	10
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)	98	522	43	11	1120	250	11	11	11	11	11	11
RTOR Reduction (vph)	0	0	13	0	0	91	0	10	0	0	0	10
Lane Group Flow (vph)	98	522	30	11	1120	159	11	12	0	11	11	1
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6						8
Actuated Green, G (s)	6.1	56.8	56.8	0.7	51.4	51.4	0.7	6.5		0.7	6.5	6.5
Effective Green, g (s)	6.1	56.8	56.8	0.7	51.4	51.4	0.7	6.5		0.7	6.5	6.5
Actuated g/C Ratio	0.08	0.70	0.70	0.01	0.64	0.64	0.01	0.08		0.01	0.08	0.08
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)	134	2491	1114	15	2254	1008	15	139		15	150	128
v/s Ratio Prot	c0.06	0.15		0.01	c0.32		c0.01	c0.01		0.01	0.01	
v/s Ratio Perm			0.02			0.10						0.00
v/c Ratio	0.73	0.21	0.03	0.73	0.50	0.16	0.73	0.09		0.73	0.07	0.01
Uniform Delay, d1	36.5	4.2	3.6	39.9	7.8	5.9	39.9	34.3		39.9	34.3	34.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	18.5	0.2	0.0	103.2	0.8	0.3	103.2	0.3		103.2	0.2	0.0
Delay (s)	55.0	4.3	3.7	143.1	8.6	6.2	143.1	34.6		143.1	34.5	34.2
Level of Service	D	A	A	F	A	A	F	C		F	C	C
Approach Delay (s)		11.8			9.2			70.8			70.6	
Approach LOS		B			A			E			E	

Intersection Summary

HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	80.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"

Sutter Pointe EIR
Existing Plus Project AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.94	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	4990	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	4990	3539	1583
Volume (vph)	30	550	30	590	1930	880	50	30	330	430	50	60
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)	33	598	33	641	2098	957	54	33	359	467	54	65
RTOR Reduction (vph)	0	0	19	0	0	198	0	0	0	0	0	53
Lane Group Flow (vph)	33	598	14	641	2098	759	54	33	359	467	54	12
Turn Type	Prot		Perm		Prot		pm+ov		Prot		Free	
Protected Phases	5	2			1	6	3	7	4			3
Permitted Phases			2				6		Free		8	
Actuated Green, G (s)	3.6	54.5	54.5	31.9	82.8	100.5	4.0	9.9	130.0	17.7	23.6	23.6
Effective Green, g (s)	3.6	54.5	54.5	31.9	82.8	100.5	4.0	9.9	130.0	17.7	23.6	23.6
Actuated g/C Ratio	0.03	0.42	0.42	0.25	0.64	0.77	0.03	0.08	1.00	0.14	0.18	0.18
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)	95	2132	664	842	3239	1272	106	270	1583	679	642	287
v/s Ratio Prot	0.01	0.12			c0.19	c0.41	c0.08	0.02	0.01			c0.09
v/s Ratio Perm			0.01				0.40		c0.23		0.01	
v/c Ratio	0.35	0.28	0.02	0.76	0.65	0.60	0.51	0.12	0.23	0.69	0.08	0.04
Uniform Delay, d1	62.0	24.8	22.1	45.5	14.6	6.2	62.0	56.0	0.0	53.5	44.2	43.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.3	0.1	4.1	1.0	0.8	3.8	0.2	0.3	2.9	0.1	0.1
Delay (s)	64.2	25.2	22.2	49.6	15.6	7.0	65.8	56.2	0.3	56.4	44.3	43.9
Level of Service	E	C	C	D	B	A	E	E	A	E	D	D
Approach Delay (s)	27.0				19.3				12.4		53.9	
Approach LOS	C				B				B		D	

Intersection Summary		
HCM Average Control Delay	23.4	HCM Level of Service C
HCM Volume to Capacity ratio	0.62	
Actuated Cycle Length (s)	130.0	Sum of lost time (s) 4.0
Intersection Capacity Utilization	71.2%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"

Sutter Pointe EIR
Existing Plus Project AM
































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	0.97	0.86	1.00	0.97	0.86	0.88	0.94	0.91	0.88	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	3433	6408	2787	4990	5085	2787	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	3433	6408	2787	4990	5085	2787	3433	5085	2787
Volume (vph)	240	1100	440	660	1480	120	390	180	200	140	370	460
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)	261	1196	478	717	1609	130	424	196	217	152	402	500
RTOR Reduction (vph)	0	0	76	0	0	62	0	0	179	0	0	394
Lane Group Flow (vph)	261	1196	402	717	1609	68	424	196	38	152	402	106
Turn Type	Prot		pm+ov	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2	7	1	6		7	4		3		8
Permitted Phases			2			6			4			8
Actuated Green, G (s)	13.7	38.8	47.8	37.4	62.5	62.5	9.0	20.8	20.8	7.0	18.8	18.8
Effective Green, g (s)	13.7	38.8	47.8	37.4	62.5	62.5	9.0	20.8	20.8	7.0	18.8	18.8
Actuated g/C Ratio	0.11	0.32	0.40	0.31	0.52	0.52	0.08	0.17	0.17	0.06	0.16	0.16
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)	392	2072	683	1070	3338	1452	374	881	483	200	797	437
v/s Ratio Prot	0.08	0.19	c0.04	c0.21	0.25		c0.08	0.04		0.04	c0.08	
v/s Ratio Perm			0.21			0.02			0.01			0.04
v/c Ratio	0.67	0.58	0.59	0.67	0.48	0.05	1.13	0.22	0.08	0.76	0.50	0.24
Uniform Delay, d1	51.0	33.8	28.4	35.9	18.4	14.1	55.5	42.6	41.6	55.7	46.3	44.4
Progression Factor	1.17	0.69	0.68	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	1.0	1.1	1.7	0.5	0.1	88.0	0.1	0.1	15.5	0.5	0.3
Delay (s)	62.9	24.3	20.5	37.6	18.9	14.2	143.5	42.8	41.6	71.2	46.8	44.7
Level of Service	E	C	C	D	B	B	F	D	D	E	D	D
Approach Delay (s)		28.6			24.1			93.5			49.3	
Approach LOS		C			C			F			D	

Intersection Summary

HCM Average Control Delay	39.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Pointe EIR
Existing Plus Project AM

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	300	830	80	100	1600	100	150	140	50	110	190	410
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)	326	902	87	109	1739	109	163	152	54	120	207	446
RTOR Reduction (vph)	0	0	51	0	0	57	0	0	41	0	0	147
Lane Group Flow (vph)	326	902	36	109	1739	52	163	152	13	120	207	299
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	10.1	39.8	39.8	8.7	38.4	38.4	10.1	23.2	23.2	9.5	22.6	22.6
Effective Green, g (s)	10.1	39.8	39.8	8.7	38.4	38.4	10.1	23.2	23.2	9.5	22.6	22.6
Actuated g/C Ratio	0.10	0.41	0.41	0.09	0.40	0.40	0.10	0.24	0.24	0.10	0.23	0.23
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)	357	2082	648	158	2009	625	184	845	378	173	823	368
v/s Ratio Prot	c0.09	0.18		0.06	c0.34		c0.09	0.04		0.07	0.06	
v/s Ratio Perm			0.02			0.03			0.01			c0.19
v/c Ratio	0.91	0.43	0.05	0.69	0.87	0.08	0.89	0.18	0.03	0.69	0.25	0.81
Uniform Delay, d1	43.1	20.6	17.3	42.9	27.0	18.4	43.0	29.4	28.4	42.4	30.4	35.3
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	26.9	0.7	0.2	11.9	5.3	0.3	36.0	0.1	0.0	11.4	0.2	12.9
Delay (s)	70.0	21.3	17.5	54.8	32.3	18.7	79.0	29.5	28.4	53.8	30.6	48.2
Level of Service	E	C	B	D	C	B	E	C	C	D	C	D
Approach Delay (s)		33.1			32.8			51.2			44.3	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM Average Control Delay		36.5			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		97.2			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		74.6%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"













Sutter Pointe EIR
Existing Plus Project AM

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	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.97	0.95	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	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	270	330	120	200	1180	530	150	240	80	270	170	30
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)	293	359	130	217	1283	576	163	261	87	293	185	33
RTOR Reduction (vph)	0	0	83	0	0	284	0	0	73	0	0	26
Lane Group Flow (vph)	293	359	47	217	1283	292	163	261	14	293	185	7
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	14.1	36.3	36.3	14.1	36.3	36.3	12.8	15.6	15.6	18.2	21.0	21.0
Effective Green, g (s)	14.1	36.3	36.3	14.1	36.3	36.3	12.8	15.6	15.6	18.2	21.0	21.0
Actuated g/C Ratio	0.14	0.36	0.36	0.14	0.36	0.36	0.13	0.16	0.16	0.18	0.21	0.21
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)	249	1842	573	249	1842	573	226	551	246	624	742	332
v/s Ratio Prot	c0.17	0.07		0.12	c0.25		c0.09	c0.07		c0.09	0.05	
v/s Ratio Perm			0.03			0.18			0.01			0.00
v/c Ratio	1.18	0.19	0.08	0.87	0.70	0.51	0.72	0.47	0.06	0.47	0.25	0.02
Uniform Delay, d1	43.1	21.9	21.0	42.2	27.3	25.0	42.0	38.6	36.0	36.7	33.0	31.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	113.3	0.2	0.3	26.6	2.2	3.2	10.8	0.6	0.1	2.5	0.2	0.0
Delay (s)	156.4	22.2	21.3	68.8	29.5	28.2	52.8	39.2	36.1	39.2	33.2	31.5
Level of Service	F	C	C	E	C	C	D	D	D	D	C	C
Approach Delay (s)		72.3			33.2			43.0			36.5	
Approach LOS		E			C			D			D	

Intersection Summary		
HCM Average Control Delay	42.8	HCM Level of Service D
HCM Volume to Capacity ratio	0.72	
Actuated Cycle Length (s)	100.2	Sum of lost time (s) 16.0
Intersection Capacity Utilization	65.4%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
53: Road "T" & Power Line Rd

Sutter Pointe EIR
Existing Plus Project AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	140	10	350	470	30	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	11	380	511	33	76
RTOR Reduction (vph)	0	9	0	218	0	0
Lane Group Flow (vph)	152	2	380	293	33	76
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	10.6	10.6	33.1	33.1	2.0	39.1
Effective Green, g (s)	10.6	10.6	33.1	33.1	2.0	39.1
Actuated g/C Ratio	0.18	0.18	0.57	0.57	0.03	0.68
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)	325	291	1069	908	61	1262
v/s Ratio Prot	c0.09		c0.20		c0.02	0.04
v/s Ratio Perm		0.00		0.19		
v/c Ratio	0.47	0.01	0.36	0.32	0.54	0.06
Uniform Delay, d1	21.0	19.2	6.6	6.4	27.4	3.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.0	0.2	0.2	9.4	0.0
Delay (s)	22.1	19.3	6.8	6.6	36.8	3.1
Level of Service	C	B	A	A	D	A
Approach Delay (s)	21.9		6.7			13.3
Approach LOS	C		A			B
Intersection Summary						
HCM Average Control Delay			9.5		HCM Level of Service	A
HCM Volume to Capacity ratio			0.39			
Actuated Cycle Length (s)			57.7		Sum of lost time (s)	12.0
Intersection Capacity Utilization			39.4%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
66: Sankey Rd & Road "C"

Sutter Pointe EIR
Existing Plus Project AM



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	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	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	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	260	10	60	280	70	330	130	700	10	10	430	100
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)	283	11	65	304	76	359	141	761	11	11	467	109
RTOR Reduction (vph)	0	0	52	0	0	153	0	0	5	0	0	72
Lane Group Flow (vph)	283	11	13	304	76	206	141	761	6	11	467	37
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	18.9	19.3	19.3	17.3	17.7	17.7	9.3	40.0	40.0	0.6	31.3	31.3
Effective Green, g (s)	18.9	19.3	19.3	17.3	17.7	17.7	9.3	40.0	40.0	0.6	31.3	31.3
Actuated g/C Ratio	0.20	0.21	0.21	0.19	0.19	0.19	0.10	0.43	0.43	0.01	0.34	0.34
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)	359	733	328	637	672	301	177	1519	679	11	1189	532
v/s Ratio Prot	c0.16	0.00		0.09	0.02		c0.08	c0.22		0.01	0.13	
v/s Ratio Perm			0.01			c0.13			0.00			0.02
v/c Ratio	0.79	0.02	0.04	0.48	0.11	0.68	0.80	0.50	0.01	1.00	0.39	0.07
Uniform Delay, d1	35.3	29.4	29.5	33.9	31.3	35.1	41.0	19.3	15.2	46.3	23.7	21.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.9	0.0	0.1	0.6	0.1	6.3	21.5	1.2	0.0	271.4	1.0	0.2
Delay (s)	46.2	29.4	29.6	34.5	31.3	41.4	62.5	20.5	15.3	317.7	24.7	21.3
Level of Service	D	C	C	C	C	D	E	C	B	F	C	C
Approach Delay (s)		42.7			37.5			26.9			29.5	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd

Sutter Point EIR
 Existing Plus Project PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	20	10	10	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	10	10	10	21	10	10	10	10	10
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	108	98	15	108	98	15	21			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108	98	15	108	98	15	21			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	841	777	1064	841	777	1064	1595			1595		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	31	31	41	31								
Volume Left	10	10	21	10								
Volume Right	10	10	10	10								
cSH	878	878	1595	1595								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	0								
Control Delay (s)	9.2	9.2	3.7	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	3.7	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			13.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Point EIR
Existing Plus Project PM

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
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	10	10	10	840	10	460	10	1910	730	130	960	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	10	866	10	474	10	1969	753	134	990	10
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	10	11	0	866	10	474	10	1969	753	134	990	10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		Free	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						Free			Free			Free
Actuated Green, G (s)	0.7	8.3		26.1	33.7	139.2	0.7	79.8	139.2	9.0	88.1	139.2
Effective Green, g (s)	0.7	8.3		26.1	33.7	139.2	0.7	79.8	139.2	9.0	88.1	139.2
Actuated g/C Ratio	0.01	0.06		0.19	0.24	1.00	0.01	0.57	1.00	0.06	0.63	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	9	103		644	451	1583	9	1656	1583	114	2116	1583
v/s Ratio Prot	0.01	0.01		c0.25	0.01		0.01	c0.68		c0.08	0.30	
v/s Ratio Perm						0.30			c0.48			0.01
v/c Ratio	1.11	0.10		1.34	0.02	0.30	1.11	1.19	0.48	1.18	0.47	0.01
Uniform Delay, d1	69.2	61.9		56.5	40.2	0.0	69.2	29.7	0.0	65.1	13.3	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	342.2	0.4		165.4	0.0	0.5	342.2	91.4	1.0	139.0	0.2	0.0
Delay (s)	411.5	62.4		221.9	40.2	0.5	411.5	121.1	1.0	204.1	13.5	0.0
Level of Service	F	E		F	D	A	F	F	A	F	B	A
Approach Delay (s)		178.7			142.8			89.1			35.9	
Approach LOS		F			F			F			D	






























Intersection Summary

HCM Average Control Delay	91.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	139.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group





















HCM Signalized Intersection Capacity Analysis
3: Sankey Rd & Road "H"

Sutter Point EIR
Existing Plus Project PM

												
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	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	530	180	150	10	310	80	290	230	70	90	310	700
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	546	186	155	10	320	82	299	237	72	93	320	722
RTOR Reduction (vph)	0	0	101	0	0	67	0	0	45	0	0	278
Lane Group Flow (vph)	546	186	54	10	320	15	299	237	27	93	320	444
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	15.0	30.5	30.5	0.8	16.3	16.3	16.0	33.4	33.4	7.5	24.9	24.9
Effective Green, g (s)	15.0	30.5	30.5	0.8	16.3	16.3	16.0	33.4	33.4	7.5	24.9	24.9
Actuated g/C Ratio	0.17	0.35	0.35	0.01	0.18	0.18	0.18	0.38	0.38	0.09	0.28	0.28
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)	584	1224	547	16	654	293	321	705	599	151	526	447
v/s Ratio Prot	c0.16	0.05		0.01	c0.09		c0.17	0.13		0.05	0.17	
v/s Ratio Perm			0.03			0.01			0.02			c0.28
v/c Ratio	0.93	0.15	0.10	0.62	0.49	0.05	0.93	0.34	0.05	0.62	0.61	0.99
Uniform Delay, d1	36.1	19.9	19.5	43.6	32.2	29.6	35.6	19.5	17.3	39.0	27.4	31.6
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	22.3	0.1	0.1	57.6	0.6	0.1	32.8	0.3	0.0	7.3	2.0	40.7
Delay (s)	58.4	20.0	19.6	101.1	32.8	29.7	68.4	19.8	17.4	46.2	29.4	72.3
Level of Service	E	B	B	F	C	C	E	B	B	D	C	E
Approach Delay (s)		43.6			33.8			43.4			58.1	
Approach LOS		D			C			D			E	
Intersection Summary												
HCM Average Control Delay			47.6	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			88.2	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			78.0%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												
































HCM Signalized Intersection Capacity Analysis
4: Riego Rd & Power Line Rd

Sutter Point EIR
Existing Plus Project PM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.86		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1773		1770	1848		1770	1596		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1773		1770	1848		1770	1596		1770	1723	
Volume (vph)	10	20	10	490	360	20	50	10	200	10	10	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	21	10	505	371	21	52	10	206	10	10	10
RTOR Reduction (vph)	0	9	0	0	3	0	0	167	0	0	8	0
Lane Group Flow (vph)	10	22	0	505	389	0	52	49	0	10	12	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.5	3.5		19.3	22.3		1.1	9.2		0.5	8.6	
Effective Green, g (s)	0.5	3.5		19.3	22.3		1.1	9.2		0.5	8.6	
Actuated g/C Ratio	0.01	0.07		0.40	0.46		0.02	0.19		0.01	0.18	
Clearance Time (s)	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	
Lane Grp Cap (vph)	18	128		704	850		40	303		18	306	
v/s Ratio Prot	0.01	0.01		c0.29	c0.21		c0.03	c0.03		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.56	0.17		0.72	0.46		1.30	0.16		0.56	0.04	
Uniform Delay, d1	23.9	21.1		12.3	9.0		23.7	16.4		23.9	16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.3	0.6		3.5	0.4		243.2	0.3		32.3	0.1	
Delay (s)	56.2	21.8		15.8	9.4		266.9	16.7		56.2	16.6	
Level of Service	E	C		B	A		F	B		E	B	
Approach Delay (s)		30.2			13.0			65.2			29.8	
Approach LOS		C			B			E			C	
Intersection Summary												
HCM Average Control Delay			25.3			HCM Level of Service					C	
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			48.5			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			53.4%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Point EIR
Existing Plus Project PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Volume (vph)	410	1520	1740	1020	1360	300	570	1940	1170	120	1240	450
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	423	1567	1794	1052	1402	309	588	2000	1206	124	1278	464
RTOR Reduction (vph)	0	0	163	0	0	67	0	0	0	0	0	0
Lane Group Flow (vph)	423	1567	1631	1052	1402	242	588	2000	1206	124	1278	464
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	12%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	23.9	61.0	61.0	22.0	59.1	59.1	23.0	54.0	160.0	7.0	38.0	160.0
Effective Green, g (s)	23.9	61.0	61.0	22.0	59.1	59.1	23.0	54.0	160.0	7.0	38.0	160.0
Actuated g/C Ratio	0.15	0.38	0.38	0.14	0.37	0.37	0.14	0.34	1.00	0.04	0.24	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	513	1939	604	472	1878	585	254	1128	1583	77	765	1583
v/s Ratio Prot	0.12	0.31		c0.31	0.28		c0.33	c0.60		0.07	0.40	
v/s Ratio Perm			c1.03			0.15			c0.76			0.29
v/c Ratio	0.82	0.81	2.70	2.23	0.75	0.41	2.31	1.77	0.76	1.61	1.67	0.29
Uniform Delay, d1	66.0	44.3	49.5	69.0	43.9	37.5	68.5	53.0	0.0	76.5	61.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	2.6	770.1	559.8	1.7	0.5	604.0	351.5	3.5	326.6	307.5	0.5
Delay (s)	76.4	46.8	819.6	628.8	45.6	38.0	672.5	404.5	3.5	403.1	368.5	0.5
Level of Service	E	D	F	F	D	D	F	F	A	F	F	A
Approach Delay (s)		416.5			266.8			318.6			279.3	
Approach LOS		F			F			F			F	

































Intersection Summary

HCM Average Control Delay	331.2	HCM Level of Service	F
HCM Volume to Capacity ratio	2.24		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	181.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group













HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

Sutter Point EIR
Existing Plus Project PM

												
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	0.97	0.86	1.00	0.97	0.86	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	450	2020	70	10	1550	280	40	70	130	260	30	600
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	464	2082	72	10	1598	289	41	72	134	268	31	619
RTOR Reduction (vph)	0	0	42	0	0	194	0	0	89	0	0	119
Lane Group Flow (vph)	464	2082	30	10	1598	95	41	72	45	268	31	500
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	9.0	38.5	38.5	0.8	30.3	30.3	2.3	24.5	24.5	11.9	34.1	34.1
Effective Green, g (s)	9.0	38.5	38.5	0.8	30.3	30.3	2.3	24.5	24.5	11.9	34.1	34.1
Actuated g/C Ratio	0.10	0.42	0.42	0.01	0.33	0.33	0.03	0.27	0.27	0.13	0.37	0.37
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)	337	2690	665	30	2117	523	86	946	423	446	1316	589
v/s Ratio Prot	c0.14	c0.32		0.00	0.25		0.01	0.02		c0.08	0.01	
v/s Ratio Perm			0.02			0.06			0.03			c0.32
v/c Ratio	1.38	0.77	0.05	0.33	0.75	0.18	0.48	0.08	0.11	0.60	0.02	0.85
Uniform Delay, d1	41.4	22.9	15.7	45.2	27.4	21.9	44.1	25.1	25.3	37.7	18.3	26.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	187.3	2.2	0.1	6.5	2.6	0.8	4.1	0.0	0.1	5.9	0.0	14.2
Delay (s)	228.6	25.1	15.9	51.6	29.9	22.6	48.2	25.2	25.4	43.5	18.3	40.7
Level of Service	F	C	B	D	C	C	D	C	C	D	B	D
Approach Delay (s)		60.9			28.9			29.1			40.8	
Approach LOS		E			C			C			D	
Intersection Summary												
HCM Average Control Delay			45.6	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			91.7	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			72.9%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Point EIR
Existing Plus Project PM

												
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		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1583	1770	3539		1770		1583			
Flt Permitted		1.00	1.00	0.16	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1583	298	3539		1770		1583			
Volume (vph)	0	1430	510	20	800	0	450	0	30	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1474	526	21	825	0	464	0	31	0	0	0
RTOR Reduction (vph)	0	0	261	0	0	0	0	0	12	0	0	0
Lane Group Flow (vph)	0	1474	265	21	825	0	464	0	19	0	0	0
Turn Type			Perm	Perm			custom		custom			
Protected Phases		4			8							
Permitted Phases			4	8			2		2			
Actuated Green, G (s)		25.0	25.0	25.0	25.0		16.6		16.6			
Effective Green, g (s)		25.0	25.0	25.0	25.0		16.6		16.6			
Actuated g/C Ratio		0.50	0.50	0.50	0.50		0.33		0.33			
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)		1784	798	150	1784		592		530			
v/s Ratio Prot		c0.42			0.23							
v/s Ratio Perm			0.17	0.07			c0.26		0.01			
v/c Ratio		0.83	0.33	0.14	0.46		0.78		0.04			
Uniform Delay, d1		10.5	7.3	6.6	8.0		14.9		11.1			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		3.3	0.2	0.4	0.2		6.7		0.0			
Delay (s)		13.7	7.6	7.0	8.1		21.6		11.1			
Level of Service		B	A	A	A		C		B			
Approach Delay (s)		12.1			8.1			20.9			0.0	
Approach LOS		B			A			C			A	
Intersection Summary												
HCM Average Control Delay			12.4				HCM Level of Service		B			
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			49.6				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			71.1%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Point EIR
 Existing Plus Project PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	↘
Sign Control		Stop	Stop		Stop	
Volume (vph)	70	1390	790	80	50	30
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	72	1433	814	82	52	31
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	1505	814	82	82		
Volume Left (vph)	72	0	0	52		
Volume Right (vph)	0	0	82	31		
Hadj (s)	0.04	0.03	-0.67	-0.07		
Departure Headway (s)	5.2	5.4	4.7	6.9		
Degree Utilization, x	2.17	1.23	0.11	0.16		
Capacity (veh/h)	698	671	750	515		
Control Delay (s)	543.2	134.1	7.1	11.2		
Approach Delay (s)	543.2	122.4		11.2		
Approach LOS	F	F		B		
Intersection Summary						
Delay			373.7			
HCM Level of Service			F			
Intersection Capacity Utilization			133.2%		ICU Level of Service	H
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Point EIR
 Existing Plus Project PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	↖
Sign Control	Stop			Stop	Stop	
Volume (vph)	880	560	40	770	100	60
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	907	577	41	794	103	62
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	907	577	835	165		
Volume Left (vph)	0	0	41	103		
Volume Right (vph)	0	577	0	62		
Hadj (s)	0.03	-0.67	0.04	-0.07		
Departure Headway (s)	5.9	5.2	5.6	6.9		
Degree Utilization, x	1.47	0.83	1.29	0.32		
Capacity (veh/h)	607	691	659	515		
Control Delay (s)	237.9	26.5	160.2	13.1		
Approach Delay (s)	155.7		160.2	13.1		
Approach LOS	F		F	B		
Intersection Summary						
Delay			147.7			
HCM Level of Service			F			
Intersection Capacity Utilization			89.0%	ICU Level of Service	E	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Point EIR
 Existing Plus Project PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	880	50	40	790	30	10	10	190	200	240	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	907	52	41	814	31	10	10	196	206	247	10
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	969	887	216	464								
Volume Left (vph)	10	41	10	206								
Volume Right (vph)	52	31	196	10								
Hadj (s)	0.00	0.02	-0.50	0.11								
Departure Headway (s)	8.4	8.4	9.1	8.5								
Degree Utilization, x	2.26	2.07	0.55	1.10								
Capacity (veh/h)	437	435	386	418								
Control Delay (s)	593.2	509.7	22.4	101.2								
Approach Delay (s)	593.2	509.7	22.4	101.2								
Approach LOS	F	F	C	F								
Intersection Summary												
Delay			425.3									
HCM Level of Service			F									
Intersection Capacity Utilization			115.6%	ICU Level of Service	H							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Point EIR
 Existing Plus Project PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1150	780	20	20	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1186	804	21	21	10
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	825				2021	814
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	825				2021	814
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				67	97
cM capacity (veh/h)	806				63	378

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1196	825	31
Volume Left	10	0	21
Volume Right	0	21	10
cSH	806	1700	87
Volume to Capacity	0.01	0.49	0.35
Queue Length 95th (ft)	1	0	34
Control Delay (s)	0.5	0.0	67.3
Lane LOS	A		F
Approach Delay (s)	0.5	0.0	67.3
Approach LOS			F

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

	→	↘	↙	←	↖	↗
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)	840	290	270	630	180	300
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	866	299	278	649	186	309
RTOR Reduction (vph)	0	139	0	0	0	71
Lane Group Flow (vph)	866	160	278	649	186	238
Turn Type		Perm	Prot		pm+ov	
Protected Phases	2		1	6	4	1
Permitted Phases		2				4
Actuated Green, G (s)	38.2	38.2	14.5	56.3	9.6	24.1
Effective Green, g (s)	40.2	40.2	14.1	58.3	9.9	24.0
Actuated g/C Ratio	0.53	0.53	0.19	0.77	0.13	0.31
Clearance Time (s)	6.0	6.0	3.6	6.0	4.3	3.6
Vehicle Extension (s)	2.0	2.0	1.0	2.0	1.0	1.0
Lane Grp Cap (vph)	983	835	328	1425	230	582
v/s Ratio Prot	c0.46		c0.16	0.35	c0.11	0.08
v/s Ratio Perm		0.10				0.07
v/c Ratio	0.88	0.19	0.85	0.46	0.81	0.41
Uniform Delay, d1	15.9	9.5	30.0	3.2	32.2	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	0.0	17.3	0.1	17.6	0.2
Delay (s)	25.0	9.5	47.4	3.3	49.8	20.7
Level of Service	C	A	D	A	D	C
Approach Delay (s)	21.0			16.5	31.6	
Approach LOS	C			B	C	
Intersection Summary						
HCM Average Control Delay			21.4		HCM Level of Service	C
HCM Volume to Capacity ratio			0.86			
Actuated Cycle Length (s)			76.2		Sum of lost time (s)	12.0
Intersection Capacity Utilization			79.1%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Point EIR
 Existing Plus Project PM

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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3486		1770	3539	1583	1770	3539	1583	1770	1863	1583	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	3486		1770	3539	1583	1770	3539	1583	1770	1863	1583	
Volume (vph)	560	720	80	250	330	160	30	480	290	50	420	350	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	577	742	82	258	340	165	31	495	299	52	433	361	
RTOR Reduction (vph)	0	9	0	0	0	111	0	0	220	0	0	260	
Lane Group Flow (vph)	577	815	0	258	340	54	31	495	79	52	433	101	
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm	
Protected Phases	5	2		1	6		7	4		3		8	
Permitted Phases						6			4			8	
Actuated Green, G (s)	25.2	27.5		14.8	17.1	17.1	1.7	20.7	20.7	3.0	22.0	22.0	
Effective Green, g (s)	25.2	29.5		14.8	19.1	19.1	1.7	22.7	22.7	3.0	24.0	24.0	
Actuated g/C Ratio	0.29	0.34		0.17	0.22	0.22	0.02	0.26	0.26	0.03	0.28	0.28	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	
Vehicle Extension (s)	2.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	
Lane Grp Cap (vph)	519	1196		305	786	352	35	934	418	62	520	442	
v/s Ratio Prot	c0.33	c0.23		0.15	0.10		0.02	0.14		c0.03	c0.23		
v/s Ratio Perm						0.03			0.05			0.06	
v/c Ratio	1.11	0.68		0.85	0.43	0.15	0.89	0.53	0.19	0.84	0.83	0.23	
Uniform Delay, d1	30.4	24.2		34.5	28.8	26.9	42.1	27.1	24.5	41.3	29.1	23.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	73.8	2.0		18.3	0.7	0.4	103.6	1.0	0.4	58.2	12.0	0.5	
Delay (s)	104.2	26.2		52.8	29.5	27.3	145.7	28.1	24.9	99.4	41.1	24.4	
Level of Service	F	C		D	C	C	F	C	C	F	D	C	
Approach Delay (s)		58.3			36.9			31.3			37.6		
Approach LOS		E			D			C			D		
Intersection Summary													
HCM Average Control Delay			43.7									HCM Level of Service	D
HCM Volume to Capacity ratio			0.84										
Actuated Cycle Length (s)			86.0									Sum of lost time (s)	8.0
Intersection Capacity Utilization			78.9%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Point EIR
 Existing Plus Project PM
























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	60	90	10	20	490	10	30	20	740	140	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	62	93	10	21	505	10	31	21	763	144	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	165	536	62	918
Volume Left (vph)	10	10	10	763
Volume Right (vph)	93	505	21	10
Hadj (s)	-0.29	-0.53	-0.13	0.19
Departure Headway (s)	6.8	5.8	7.4	6.4
Degree Utilization, x	0.31	0.87	0.13	1.63
Capacity (veh/h)	502	536	450	556
Control Delay (s)	12.9	35.3	11.4	309.6
Approach Delay (s)	12.9	35.3	11.4	309.6
Approach LOS	B	E	B	F

Intersection Summary			
Delay		182.0	
HCM Level of Service		F	
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
 15: Elverta Rd & Hwy 99

Sutter Point EIR
 Existing Plus Project PM

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.88		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1639		1681	1670		1770	2888	1583	1770	3343	1583
Flt Permitted		1.00		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1639		1681	1670		1770	2888	1583	1770	3343	1583
Volume (vph)	20	70	670	520	30	40	430	2950	600	300	2730	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	72	691	536	31	41	443	3041	619	309	2814	10
RTOR Reduction (vph)	0	106	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	678	0	308	297	0	443	3041	619	309	2814	10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Split		Prot		Free		Prot		Free	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									Free			Free
Actuated Green, G (s)		29.0		23.0	23.0		16.0	70.0	150.0	12.0	66.0	150.0
Effective Green, g (s)		29.0		23.0	23.0		16.0	70.0	150.0	12.0	66.0	150.0
Actuated g/C Ratio		0.19		0.15	0.15		0.11	0.47	1.00	0.08	0.44	1.00
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		317		258	256		189	1348	1583	142	1471	1583
v/s Ratio Prot		c0.41		c0.18	0.18		c0.25	c1.05		0.17	0.84	
v/s Ratio Perm									0.39			0.01
v/c Ratio		2.14		1.19	1.16		2.34	2.26	0.39	2.18	1.91	0.01
Uniform Delay, d1		60.5		63.5	63.5		67.0	40.0	0.0	69.0	42.0	0.0
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		522.2		118.8	106.0		620.9	567.6	0.7	551.7	413.4	0.0
Delay (s)		582.7		182.3	169.5		687.9	607.6	0.7	620.7	455.4	0.0
Level of Service		F		F	F		F	F	A	F	F	A
Approach Delay (s)		582.7		176.0			524.7			470.2		
Approach LOS		F		F			F			F		
Intersection Summary												
HCM Average Control Delay		485.6		HCM Level of Service				F				
HCM Volume to Capacity ratio		2.08										
Actuated Cycle Length (s)		150.0		Sum of lost time (s)				16.0				
Intersection Capacity Utilization		175.2%		ICU Level of Service				H				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Point EIR
 Existing Plus Project PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	640	60	30	130	410	10	70	100	10	20	520
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	660	62	31	134	423	10	72	103	10	21	536

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	742	588	186	567
Volume Left (vph)	21	31	10	10
Volume Right (vph)	62	423	103	536
Hadj (s)	-0.01	-0.39	-0.29	-0.53
Departure Headway (s)	8.2	7.8	9.3	7.7
Degree Utilization, x	1.69	1.28	0.48	1.21
Capacity (veh/h)	443	468	375	463
Control Delay (s)	341.8	165.4	20.5	138.6
Approach Delay (s)	341.8	165.4	20.5	138.6
Approach LOS	F	F	C	F

Intersection Summary			
Delay		208.1	
HCM Level of Service		F	
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Point EIR
 Existing Plus Project PM



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)	140	680	0	0	470	10	0	0	0	270	0	70
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	144	701	0	0	485	10	0	0	0	278	0	72
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	495			701			1546	1485	701	1479	1479	490
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			701			1546	1485	701	1479	1479	490
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 %	86			100			100	100	100	0	100	88
cM capacity (veh/h)	1069			896			73	108	439	93	109	579

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	845	0	495	0	351
Volume Left	144	0	0	0	278
Volume Right	0	0	10	0	72
cSH	1069	1700	1700	1700	112
Volume to Capacity	0.14	0.00	0.29	0.00	3.12
Queue Length 95th (ft)	12	0	0	0	Err
Control Delay (s)	3.2	0.0	0.0	0.0	Err
Lane LOS	A			A	F
Approach Delay (s)	3.2	0.0		0.0	Err
Approach LOS				A	F

Intersection Summary		
Average Delay		2074.6
Intersection Capacity Utilization	98.1%	ICU Level of Service F
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	640	360	20	20	20
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	660	371	21	21	21
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	392				1062	381
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	392				1062	381
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				92	97
cM capacity (veh/h)	1167				245	666

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	670	392	41
Volume Left	10	0	21
Volume Right	0	21	21
cSH	1167	1700	359
Volume to Capacity	0.01	0.23	0.12
Queue Length 95th (ft)	1	0	10
Control Delay (s)	0.2	0.0	16.3
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	16.3
Approach LOS			C

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

Sutter Point EIR
 Existing Plus Project PM



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)	70	590	10	70	340	10	20	20	120	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	72	608	10	72	351	10	21	21	124	10	10	10
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	361			619			1273	1263	613	1392	1263	356
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	361			619			1273	1263	613	1392	1263	356
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 %	94			92			83	86	75	86	93	99
cM capacity (veh/h)	1198			962			121	148	492	72	148	688
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	691	433	165	31								
Volume Left	72	72	21	10								
Volume Right	10	10	124	10								
cSH	1198	962	294	136								
Volume to Capacity	0.06	0.08	0.56	0.23								
Queue Length 95th (ft)	5	6	80	21								
Control Delay (s)	1.6	2.2	31.9	39.2								
Lane LOS	A	A	D	E								
Approach Delay (s)	1.6	2.2	31.9	39.2								
Approach LOS			D	E								
Intersection Summary												
Average Delay			6.4									
Intersection Capacity Utilization			59.3%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Point EIR
Existing Plus Project PM















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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	230	430	160	280	200	100	390	640	380	160	450	150
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	237	443	165	289	206	103	402	660	392	165	464	155
RTOR Reduction (vph)	0	0	114	0	0	78	0	0	183	0	0	106
Lane Group Flow (vph)	237	443	51	289	206	25	402	660	209	165	464	49
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	8.3	21.2	21.2	3.6	16.8	16.8	4.7	23.3	23.3	3.1	21.7	21.7
Effective Green, g (s)	9.8	22.9	22.9	5.1	18.2	18.2	6.2	25.0	25.0	4.6	23.4	23.4
Actuated g/C Ratio	0.13	0.31	0.31	0.07	0.25	0.25	0.08	0.34	0.34	0.06	0.32	0.32
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	457	1101	493	238	875	391	289	1727	538	215	1617	503
v/s Ratio Prot	c0.07	c0.13		c0.08	0.06		c0.12	0.13		0.05	0.09	
v/s Ratio Perm			0.03			0.02			c0.13			0.03
v/c Ratio	0.52	0.40	0.10	1.21	0.24	0.07	1.39	0.38	0.39	0.77	0.29	0.10
Uniform Delay, d1	29.7	20.0	18.0	34.2	22.1	21.2	33.7	18.4	18.5	34.0	18.8	17.7
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	0.7	0.3	128.6	0.3	0.1	195.9	0.3	1.1	13.7	0.2	0.2
Delay (s)	30.1	20.6	18.3	162.8	22.4	21.3	229.6	18.8	19.6	47.7	19.1	17.9
Level of Service	C	C	B	F	C	C	F	B	B	D	B	B
Approach Delay (s)		22.8			90.1			77.3			24.9	
Approach LOS		C			F			E			C	

Intersection Summary

HCM Average Control Delay	55.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	73.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			













HCM Unsignalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Point EIR
 Existing Plus Project PM

												
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	420	130	0	40	360	0	0	0	420	0	20
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	433	134	0	41	371	0	0	0	433	0	21
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	41			433			495	474	433	474	474	41
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	41			433			495	474	433	474	474	41
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			100			100	100	100	13	100	98
cM capacity (veh/h)	1568			1127			475	489	623	501	489	1030
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2						
Volume Total	433	134	41	371	433	21						
Volume Left	0	0	0	0	433	0						
Volume Right	0	134	0	371	0	21						
cSH	1700	1700	1700	1700	501	1030						
Volume to Capacity	0.25	0.08	0.02	0.22	0.87	0.02						
Queue Length 95th (ft)	0	0	0	0	230	2						
Control Delay (s)	0.0	0.0	0.0	0.0	42.8	8.6						
Lane LOS					E	A						
Approach Delay (s)	0.0		0.0		41.3							
Approach LOS					E							
Intersection Summary												
Average Delay			13.1									
Intersection Capacity Utilization			52.0%		ICU Level of Service					A		
Analysis Period (min)			15									













HCM Unsignalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Point EIR
 Existing Plus Project PM

												
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	480	360	0	350	240	50	0	1070	0	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	495	371	0	361	247	52	0	1103	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)												
pX, platoon unblocked												
vC, conflicting volume	361			495			856	856	495	1959	856	361
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	361			495			856	856	495	1959	856	361
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			100			81	100	0	0	100	100
cM capacity (veh/h)	1198			1069			278	295	575	0	295	684
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2						
Volume Total	495	371	361	247	52	1103						
Volume Left	0	0	0	0	52	0						
Volume Right	0	371	0	247	0	1103						
cSH	1700	1700	1700	1700	278	575						
Volume to Capacity	0.29	0.22	0.21	0.15	0.19	1.92						
Queue Length 95th (ft)	0	0	0	0	17	1795						
Control Delay (s)	0.0	0.0	0.0	0.0	20.9	437.8						
Lane LOS					C	F						
Approach Delay (s)	0.0		0.0		419.2							
Approach LOS					F							
Intersection Summary												
Average Delay			184.1									
Intersection Capacity Utilization			98.2%		ICU Level of Service		F					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

Sutter Point EIR
 Existing Plus Project PM

												
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	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)	0	640	100	160	290	0	70	0	310	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	660	103	165	299	0	72	0	320	0	0	0
RTOR Reduction (vph)	0	0	50	0	0	0	0	0	280	0	0	0
Lane Group Flow (vph)	0	660	53	165	299	0	72	0	40	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		23.8	23.8	6.3	33.6		6.7		6.7			
Effective Green, g (s)		25.3	25.3	5.8	35.1		6.2		6.2			
Actuated g/C Ratio		0.51	0.51	0.12	0.71		0.13		0.13			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		956	812	208	1326		223		199			
v/s Ratio Prot		c0.35		c0.09	0.16		c0.04					
v/s Ratio Perm			0.03						0.03			
v/c Ratio		0.69	0.07	0.79	0.23		0.32		0.20			
Uniform Delay, d1		9.0	6.0	21.2	2.4		19.6		19.3			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		2.2	0.0	17.4	0.1		0.3		0.2			
Delay (s)		11.2	6.1	38.5	2.5		19.9		19.5			
Level of Service		B	A	D	A		B		B			
Approach Delay (s)		10.5			15.3			19.6			0.0	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM Average Control Delay			14.1			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			49.3			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			59.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Point EIR
 Existing Plus Project PM




























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	130	810	440	50	70	50
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	134	835	454	52	72	52
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	505				1582	479
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	505				1582	479
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				31	91
cM capacity (veh/h)	1059				104	586

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	969	505	72	52
Volume Left	134	0	72	0
Volume Right	0	52	0	52
cSH	1059	1700	104	586
Volume to Capacity	0.13	0.30	0.69	0.09
Queue Length 95th (ft)	11	0	89	7
Control Delay (s)	3.1	0.0	94.6	11.7
Lane LOS	A		F	B
Approach Delay (s)	3.1	0.0	60.1	
Approach LOS			F	

Intersection Summary			
Average Delay		6.6	
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)		15	



























HCM Signalized Intersection Capacity Analysis
45: Riego Rd & Road "U"

Sutter Point EIR
Existing Plus Project PM

												
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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3524		1770	3539	1583	1770	1863	1583	1770	1631	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3524		1770	3539	1583	1770	1863	1583	1770	1631	
Volume (vph)	80	320	10	180	760	120	20	20	400	280	20	100
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	330	10	186	784	124	21	21	412	289	21	103
RTOR Reduction (vph)	0	2	0	0	0	75	0	0	280	0	70	0
Lane Group Flow (vph)	82	338	0	186	784	49	21	21	132	289	54	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6			4			
Actuated Green, G (s)	4.7	28.1		8.1	31.5	31.5	1.8	14.1	14.1	13.1	25.4	
Effective Green, g (s)	4.7	28.1		8.1	31.5	31.5	1.8	14.1	14.1	13.1	25.4	
Actuated g/C Ratio	0.06	0.35		0.10	0.40	0.40	0.02	0.18	0.18	0.16	0.32	
Clearance Time (s)	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	
Lane Grp Cap (vph)	105	1247		181	1404	628	40	331	281	292	522	
v/s Ratio Prot	0.05	0.10		c0.11	c0.22		0.01	0.01		c0.16	0.03	
v/s Ratio Perm						0.03			c0.08			
v/c Ratio	0.78	0.27		1.03	0.56	0.08	0.53	0.06	0.47	0.99	0.10	
Uniform Delay, d1	36.8	18.3		35.7	18.6	14.9	38.4	27.2	29.3	33.1	19.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	30.4	0.5		74.3	1.6	0.2	11.9	0.1	1.2	49.3	0.1	
Delay (s)	67.3	18.9		110.0	20.2	15.2	50.3	27.2	30.6	82.4	19.1	
Level of Service	E	B		F	C	B	D	C	C	F	B	
Approach Delay (s)		28.3			34.9			31.3			63.4	
Approach LOS		C			C			C			E	
Intersection Summary												
HCM Average Control Delay			38.0				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			79.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			59.4%				ICU Level of Service			B		
Analysis Period (min)			15									
c	Critical Lane Group											




































HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Point EIR
Existing Plus Project PM

													
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	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583	
Volume (vph)	120	980	20	10	750	190	50	10	10	350	30	310	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	124	1010	21	10	773	196	52	10	10	361	31	320	
RTOR Reduction (vph)	0	0	11	0	0	115	0	9	0	0	0	154	
Lane Group Flow (vph)	124	1010	10	10	773	81	52	11	0	361	31	166	
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm	
Protected Phases	5	2		1	6		7	4		3		8	
Permitted Phases			2			6						8	
Actuated Green, G (s)	5.1	35.6	35.6	0.6	31.1	31.1	3.4	5.3		17.3	19.2	19.2	
Effective Green, g (s)	5.1	35.6	35.6	0.6	31.1	31.1	3.4	5.3		17.3	19.2	19.2	
Actuated g/C Ratio	0.07	0.48	0.48	0.01	0.42	0.42	0.05	0.07		0.23	0.26	0.26	
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)	121	1684	753	14	1471	658	80	122		409	478	406	
v/s Ratio Prot	c0.07	c0.29		0.01	0.22		0.03	0.01		c0.20	0.02		
v/s Ratio Perm			0.01			0.05						c0.10	
v/c Ratio	1.02	0.60	0.01	0.71	0.53	0.12	0.65	0.09		0.88	0.06	0.41	
Uniform Delay, d1	34.9	14.4	10.3	37.0	16.3	13.5	35.1	32.5		27.8	21.0	23.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	
Incremental Delay, d2	88.6	1.6	0.0	100.1	1.3	0.4	17.3	0.3		19.5	0.1	0.7	
Delay (s)	123.4	16.0	10.4	137.1	17.7	13.8	52.4	32.8		47.3	21.1	23.8	
Level of Service	F	B	B	F	B	B	D	C		D	C	C	
Approach Delay (s)		27.4			18.1			47.0			35.6		
Approach LOS		C			B			D			D		
Intersection Summary													
HCM Average Control Delay			26.8				HCM Level of Service				C		
HCM Volume to Capacity ratio			0.66										
Actuated Cycle Length (s)			74.8				Sum of lost time (s)			8.0			
Intersection Capacity Utilization			66.5%				ICU Level of Service			C			
Analysis Period (min)			15										
c Critical Lane Group													

























HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"

Sutter Point EIR
Existing Plus Project PM

													
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.94	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	4990	3539	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	4990	3539	1583	
Volume (vph)	10	1790	130	370	1020	990	80	110	590	1290	140	10	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	10	1845	134	381	1052	1021	82	113	608	1330	144	10	
RTOR Reduction (vph)	0	0	42	0	0	131	0	0	0	0	0	7	
Lane Group Flow (vph)	10	1845	92	381	1052	890	82	113	608	1330	144	3	
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Free	Prot		Perm	
Protected Phases	5	2		1	6	3	7	4		3	8		
Permitted Phases			2			6			Free			8	
Actuated Green, G (s)	2.0	69.1	69.1	16.4	83.5	117.5	6.9	14.5	150.0	34.0	41.6	41.6	
Effective Green, g (s)	2.0	69.1	69.1	16.4	83.5	117.5	6.9	14.5	150.0	34.0	41.6	41.6	
Actuated g/C Ratio	0.01	0.46	0.46	0.11	0.56	0.78	0.05	0.10	1.00	0.23	0.28	0.28	
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)	46	2342	729	375	2831	1282	158	342	1583	1131	981	439	
v/s Ratio Prot	0.00	c0.36		c0.11	0.21	0.16	0.02	0.03		c0.27	0.04		
v/s Ratio Perm			0.06			0.40			c0.38			0.00	
v/c Ratio	0.22	0.79	0.13	1.02	0.37	0.69	0.52	0.33	0.38	1.18	0.15	0.01	
Uniform Delay, d1	73.2	34.2	23.2	66.8	18.6	7.7	69.9	63.2	0.0	58.0	40.8	39.2	
Progression Factor	1.00	1.00	1.00	0.97	1.00	1.38	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.4	2.8	0.4	45.9	0.3	1.3	2.9	0.6	0.7	88.7	0.1	0.0	
Delay (s)	75.6	37.0	23.5	110.7	18.9	12.0	72.8	63.8	0.7	146.7	40.9	39.2	
Level of Service	E	D	C	F	B	B	E	E	A	F	D	D	
Approach Delay (s)		36.3			30.3			16.9			135.7		
Approach LOS		D			C			B			F		
Intersection Summary													
HCM Average Control Delay	53.7		HCM Level of Service					D					
HCM Volume to Capacity ratio	0.86												
Actuated Cycle Length (s)	150.0		Sum of lost time (s)					12.0					
Intersection Capacity Utilization	86.3%		ICU Level of Service					E					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"

Sutter Point EIR
Existing Plus Project PM
































												
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	0.97	0.86	1.00	0.97	0.86	0.88	0.94	0.91	0.88	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	3433	6408	2787	4990	5085	2787	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	3433	6408	2787	4990	5085	2787	3433	5085	2787
Volume (vph)	670	1480	660	640	1180	250	950	660	820	230	410	550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	691	1526	680	660	1216	258	979	680	845	237	423	567
RTOR Reduction (vph)	0	0	32	0	0	183	0	0	513	0	0	485
Lane Group Flow (vph)	691	1526	648	660	1216	75	979	680	332	237	423	82
Turn Type	Prot		pm+ov	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2	7	1	6		7	4		3		8
Permitted Phases			2			6			4			8
Actuated Green, G (s)	39.6	45.6	74.6	37.8	43.8	43.8	29.0	36.0	36.0	14.6	21.6	21.6
Effective Green, g (s)	39.6	45.6	74.6	37.8	43.8	43.8	29.0	36.0	36.0	14.6	21.6	21.6
Actuated g/C Ratio	0.26	0.30	0.50	0.25	0.29	0.29	0.19	0.24	0.24	0.10	0.14	0.14
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)	906	1948	829	865	1871	814	965	1220	669	334	732	401
v/s Ratio Prot	c0.20	0.24	c0.15	0.19	0.19		c0.20	c0.13		0.07	0.08	
v/s Ratio Perm			0.26			0.03			0.12			0.03
v/c Ratio	0.76	0.78	0.78	0.76	0.65	0.09	1.01	0.56	0.50	0.71	0.58	0.20
Uniform Delay, d1	50.9	47.7	31.0	52.0	46.4	38.6	60.5	50.0	49.2	65.6	59.9	56.6
Progression Factor	0.89	1.06	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	2.0	3.1	4.0	1.8	0.2	32.6	0.6	0.6	6.8	1.1	0.3
Delay (s)	47.5	52.4	27.6	56.0	48.2	38.9	93.1	50.6	49.8	72.4	61.1	56.9
Level of Service	D	D	C	E	D	D	F	D	D	E	E	E
Approach Delay (s)		45.4			49.5			66.9			61.3	
Approach LOS		D			D			E			E	

Intersection Summary

HCM Average Control Delay	54.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Point EIR
Existing Plus Project PM

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	680	1400	200	110	1210	130	160	230	110	130	200	420
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	701	1443	206	113	1247	134	165	237	113	134	206	433
RTOR Reduction (vph)	0	0	104	0	0	84	0	0	94	0	0	252
Lane Group Flow (vph)	701	1443	102	113	1247	50	165	237	19	134	206	181
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	21.2	49.7	49.7	9.7	38.2	38.2	10.1	17.8	17.8	10.1	17.8	17.8
Effective Green, g (s)	21.2	49.7	49.7	9.7	38.2	38.2	10.1	17.8	17.8	10.1	17.8	17.8
Actuated g/C Ratio	0.21	0.48	0.48	0.09	0.37	0.37	0.10	0.17	0.17	0.10	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	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)	705	2447	762	166	1880	585	173	610	273	173	610	273
v/s Ratio Prot	c0.20	0.28		0.06	c0.25		c0.09	0.07		0.08	0.06	
v/s Ratio Perm			0.06			0.03			0.01			c0.11
v/c Ratio	0.99	0.59	0.13	0.68	0.66	0.08	0.95	0.39	0.07	0.77	0.34	0.66
Uniform Delay, d1	41.0	19.4	14.9	45.3	27.2	21.2	46.4	37.9	35.8	45.5	37.6	40.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.3	1.1	0.4	10.9	1.9	0.3	54.5	0.4	0.1	19.2	0.3	6.0
Delay (s)	73.3	20.5	15.2	56.2	29.0	21.5	100.9	38.3	35.9	64.7	37.9	45.9
Level of Service	E	C	B	E	C	C	F	D	D	E	D	D
Approach Delay (s)		35.8			30.4			57.9			47.0	
Approach LOS		D			C			E			D	
Intersection Summary												
HCM Average Control Delay			38.1			HCM Level of Service						D
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			103.3			Sum of lost time (s)						16.0
Intersection Capacity Utilization			70.5%			ICU Level of Service						C
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"

Sutter Point EIR
Existing Plus Project PM

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	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.97	0.95	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	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	300	780	210	180	850	380	170	270	250	780	280	100
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	309	804	216	186	876	392	175	278	258	804	289	103
RTOR Reduction (vph)	0	0	143	0	0	282	0	0	222	0	0	75
Lane Group Flow (vph)	309	804	73	186	876	110	175	278	36	804	289	28
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	26.1	45.0	45.0	18.3	37.2	37.2	17.6	18.5	18.5	35.1	36.0	36.0
Effective Green, g (s)	26.1	45.0	45.0	18.3	37.2	37.2	17.6	18.5	18.5	35.1	36.0	36.0
Actuated g/C Ratio	0.20	0.34	0.34	0.14	0.28	0.28	0.13	0.14	0.14	0.26	0.27	0.27
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)	348	1722	536	244	1423	443	234	493	220	907	959	429
v/s Ratio Prot	c0.17	0.16		0.11	c0.17		0.10	c0.08		c0.23	0.08	
v/s Ratio Perm			0.05			0.07			0.02			0.02
v/c Ratio	0.89	0.47	0.14	0.76	0.62	0.25	0.75	0.56	0.16	0.89	0.30	0.07
Uniform Delay, d1	52.0	34.5	30.5	55.2	41.6	37.0	55.5	53.4	50.4	47.0	38.5	36.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.8	0.9	0.5	13.1	2.0	1.3	12.3	1.5	0.4	12.5	0.2	0.1
Delay (s)	74.8	35.4	31.0	68.4	43.6	38.4	67.8	54.9	50.7	59.4	38.6	36.0
Level of Service	E	D	C	E	D	D	E	D	D	E	D	D
Approach Delay (s)		43.9			45.4			56.6			52.4	
Approach LOS		D			D			E			D	
Intersection Summary												
HCM Average Control Delay			48.4	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			132.9	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			76.1%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												































HCM Signalized Intersection Capacity Analysis
53: Road "T" & Power Line Rd

Sutter Point EIR
Existing Plus Project PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	390	50	190	320	10	490
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	402	52	196	330	10	505
RTOR Reduction (vph)	0	36	0	206	0	0
Lane Group Flow (vph)	402	16	196	124	10	505
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	12.9	12.9	15.4	15.4	0.6	20.0
Effective Green, g (s)	12.9	12.9	15.4	15.4	0.6	20.0
Actuated g/C Ratio	0.32	0.32	0.38	0.38	0.01	0.49
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)	558	499	701	596	26	911
v/s Ratio Prot	c0.23		0.11		0.01	c0.27
v/s Ratio Perm		0.01		0.08		
v/c Ratio	0.72	0.03	0.28	0.21	0.38	0.55
Uniform Delay, d1	12.4	9.7	8.9	8.6	20.0	7.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.0	0.2	0.2	9.2	0.7
Delay (s)	17.0	9.7	9.1	8.8	29.2	8.1
Level of Service	B	A	A	A	C	A
Approach Delay (s)	16.1		8.9			8.5
Approach LOS	B		A			A
Intersection Summary						
HCM Average Control Delay			11.0		HCM Level of Service	B
HCM Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			40.9		Sum of lost time (s)	8.0
Intersection Capacity Utilization			54.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

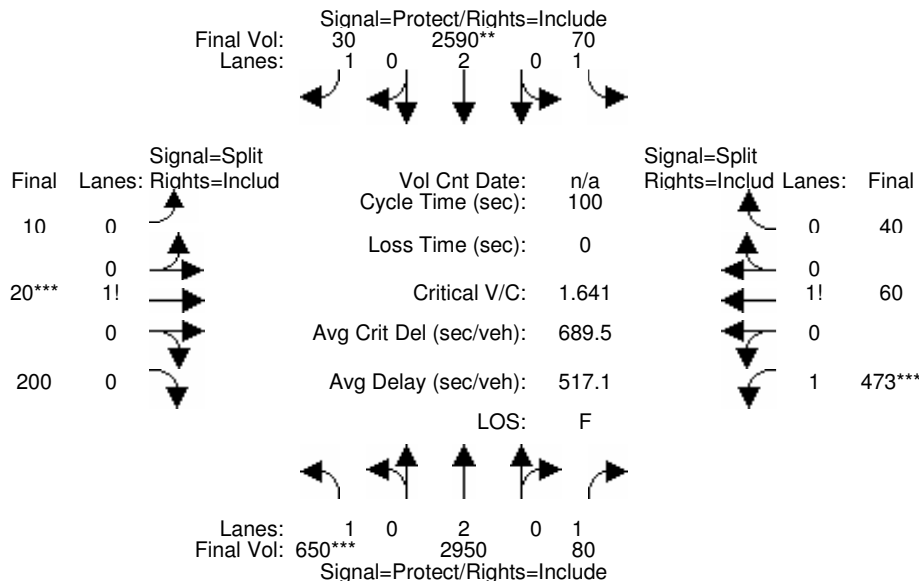
HCM Signalized Intersection Capacity Analysis
66: Sankey Rd & Road "C"

Sutter Point EIR
Existing Plus Project PM

												
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	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	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	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	100	50	100	20	10	10	110	610	330	330	760	240
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	103	52	103	21	10	10	113	629	340	340	784	247
RTOR Reduction (vph)	0	0	87	0	0	9	0	0	201	0	0	106
Lane Group Flow (vph)	103	52	16	21	10	1	113	629	139	340	784	141
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.0	11.2	11.2	1.3	4.5	4.5	10.2	28.4	28.4	16.6	34.8	34.8
Effective Green, g (s)	8.0	11.2	11.2	1.3	4.5	4.5	10.2	28.4	28.4	16.6	34.8	34.8
Actuated g/C Ratio	0.11	0.15	0.15	0.02	0.06	0.06	0.14	0.39	0.39	0.23	0.47	0.47
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)	193	539	241	61	217	97	246	1367	612	400	1676	750
v/s Ratio Prot	c0.06	c0.01		0.01	0.00		0.06	0.18		c0.19	c0.22	
v/s Ratio Perm			0.01		0.00				0.09			0.09
v/c Ratio	0.53	0.10	0.07	0.34	0.05	0.01	0.46	0.46	0.23	0.85	0.47	0.19
Uniform Delay, d1	31.0	26.8	26.7	35.7	32.5	32.4	29.1	16.8	15.2	27.3	13.1	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.1	0.1	3.4	0.1	0.0	1.4	1.1	0.9	15.4	0.9	0.6
Delay (s)	33.8	26.9	26.8	39.0	32.6	32.4	30.5	17.9	16.0	42.7	14.0	11.7
Level of Service	C	C	C	D	C	C	C	B	B	D	B	B
Approach Delay (s)		29.6			35.9			18.7			20.7	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM Average Control Delay			21.0				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			73.5				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			57.4%				ICU Level of Service		B			
Analysis Period (min)			15									
c	Critical Lane Group											

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Project AM

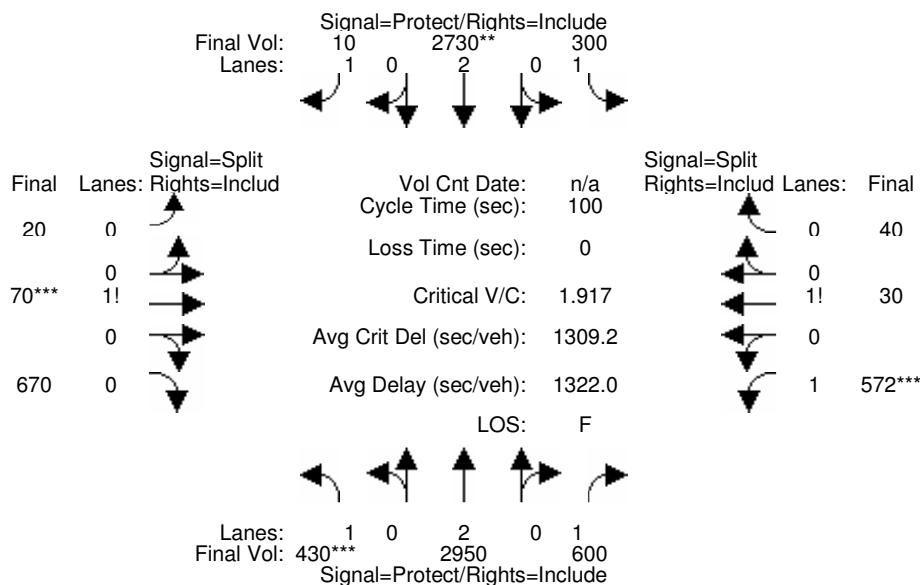
Intersection #15: Elverta Road / SR 70 / SR 99



Street Name:	SR 70 / SR 99						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	650	2950	80	70	2590	30	10	20	200	430	60	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	650	2950	80	70	2590	30	10	20	200	430	60	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	650	2950	80	70	2590	30	10	20	200	430	60	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	650	2950	80	70	2590	30	10	20	200	430	60	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	650	2950	80	70	2590	30	10	20	200	430	60	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	650	2950	80	70	2590	30	10	20	200	473	60	40
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.04	0.09	0.87	1.65	0.21	0.14
Final Sat.:	1500	3000	1500	1500	3000	1500	65	130	1304	2476	314	209
Capacity Analysis Module:												
Vol/Sat:	0.43	0.98	0.05	0.05	0.86	0.02	0.15	0.15	0.15	0.19	0.19	0.19
Crit Volume:	650			1295			230			287		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Project PM

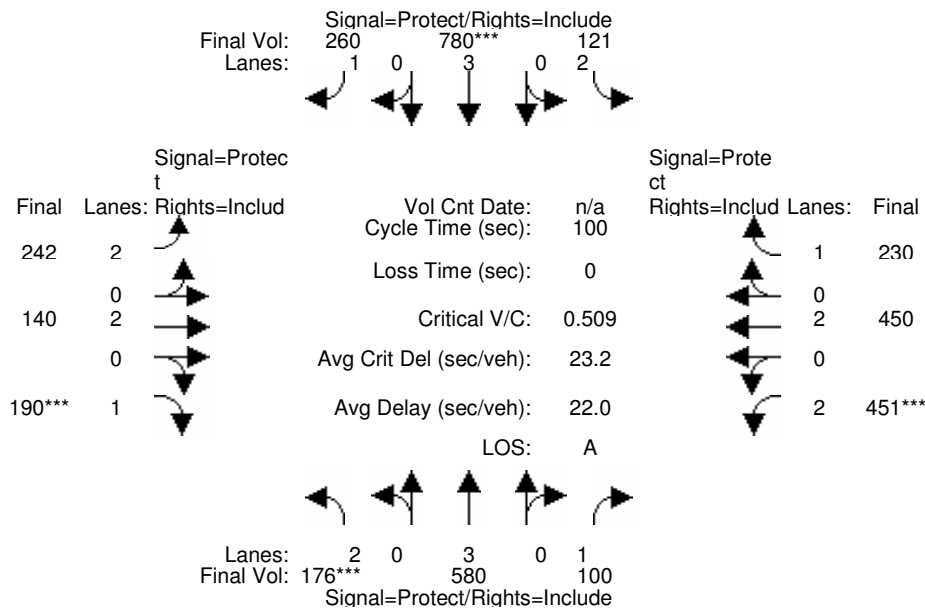
Intersection #15: Elverta Road / SR 70 / SR 99



Street Name:	SR 70 / SR 99						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	430	2950	600	300	2730	10	20	70	670	520	30	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	430	2950	600	300	2730	10	20	70	670	520	30	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	430	2950	600	300	2730	10	20	70	670	520	30	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	430	2950	600	300	2730	10	20	70	670	520	30	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	430	2950	600	300	2730	10	20	70	670	520	30	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	430	2950	600	300	2730	10	20	70	670	572	30	40
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.03	0.09	0.88	1.79	0.09	0.12
Final Sat.:	1500	3000	1500	1500	3000	1500	39	138	1322	2673	140	187
Capacity Analysis Module:												
Vol/Sat:	0.29	0.98	0.40	0.20	0.91	0.01	0.51	0.51	0.51	0.21	0.21	0.21
Crit Volume:	430			1365			760			321		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Project AM

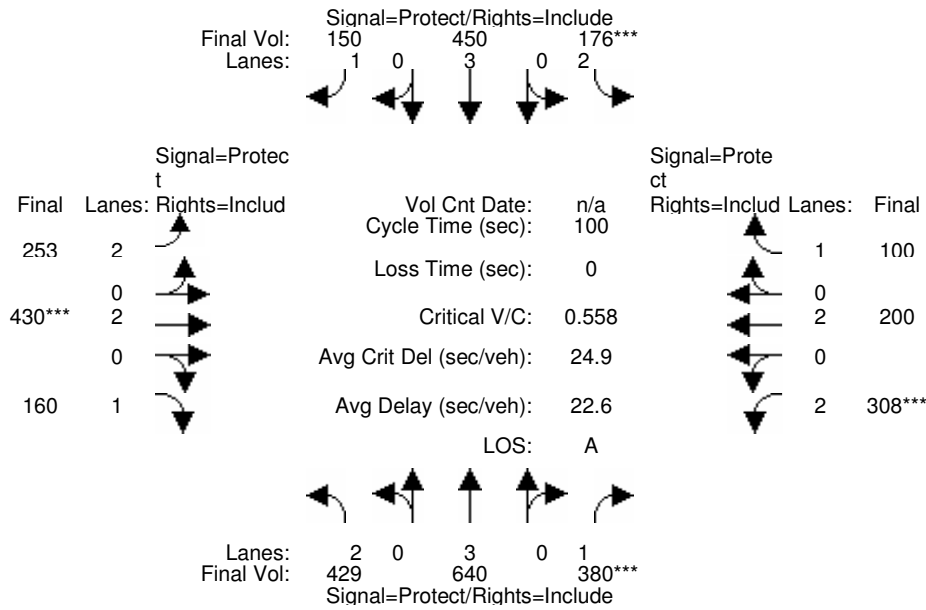
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	160	580	100	110	780	260	220	140	190	410	450	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	160	580	100	110	780	260	220	140	190	410	450	230
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	160	580	100	110	780	260	220	140	190	410	450	230
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	160	580	100	110	780	260	220	140	190	410	450	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	160	580	100	110	780	260	220	140	190	410	450	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	176	580	100	121	780	260	242	140	190	451	450	230
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.06	0.13	0.07	0.04	0.17	0.17	0.08	0.05	0.13	0.15	0.15	0.15
Crit Volume:	88			260			190	226				
Crit Moves:	****			****			****	****		****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Project PM

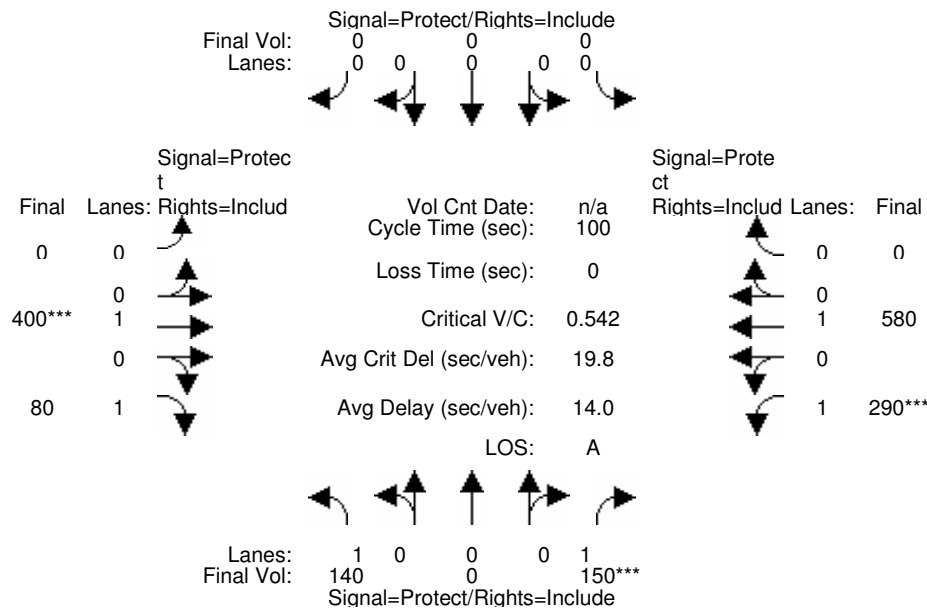
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	390	640	380	160	450	150	230	430	160	280	200	100
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	390	640	380	160	450	150	230	430	160	280	200	100
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	390	640	380	160	450	150	230	430	160	280	200	100
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	390	640	380	160	450	150	230	430	160	280	200	100
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	390	640	380	160	450	150	230	430	160	280	200	100
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	429	640	380	176	450	150	253	430	160	308	200	100
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.14	0.14	0.25	0.06	0.10	0.10	0.08	0.14	0.11	0.10	0.07	0.07
Crit Volume:			380			88			215			154
Crit Moves:			***			***			***			***

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Project AM

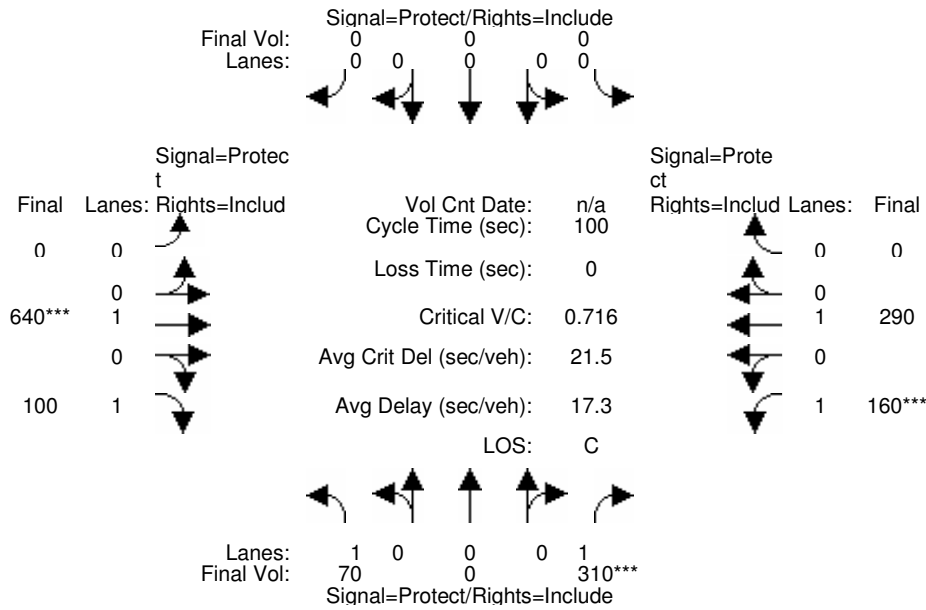
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	140	0	150	0	0	0	0	400	80	290	580	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	140	0	150	0	0	0	0	400	80	290	580	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	140	0	150	0	0	0	0	400	80	290	580	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	140	0	150	0	0	0	0	400	80	290	580	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	140	0	150	0	0	0	0	400	80	290	580	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	140	0	150	0	0	0	0	400	80	290	580	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	1550	1550	0
Capacity Analysis Module:												
Vol/Sat:	0.09	0.00	0.10	0.00	0.00	0.00	0.00	0.26	0.05	0.19	0.37	0.00
Crit Volume:			150	0			400		290			
Crit Moves:			***				***		***			

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Project PM

Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	70	0	310	0	0	0	0	640	100	160	290	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	70	0	310	0	0	0	0	640	100	160	290	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	70	0	310	0	0	0	0	640	100	160	290	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	70	0	310	0	0	0	0	640	100	160	290	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	70	0	310	0	0	0	0	640	100	160	290	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	70	0	310	0	0	0	0	640	100	160	290	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	1550	1550	0
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.20	0.00	0.00	0.00	0.00	0.41	0.06	0.10	0.19	0.00
Crit Volume:			310	0				640		160		
Crit Moves:			***					***		***		

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4780 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 590 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4780	590	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1299	160	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5845	657	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 3408$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6502	7050	No
$v v$	2437 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3408	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.530
S
Space mean speed in ramp influence area, S = 52.8 mph
R
Space mean speed in outer lanes, S = 57.6 mph
O
Space mean speed for all vehicles, S = 54.5 mph

Average passenger-car speed, S 57.3 mi/h
 Number of lanes, N 3
 Density, D 38.2 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1459 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2189 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2189 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 20.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2165 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 588 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1324 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1324 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 63.4 mi/h
 Number of lanes, N 2
 Density, D 29.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3030 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 823 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1853 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1853 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.8 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: Airport Blvd to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2740 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 745 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1549 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1549 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 20.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2345 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 637 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1325 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1325 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 60.8 mi/h
 Number of lanes, N 3
 Density, D 33.6 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Del Paso Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5410 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1470 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2039 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2039 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 5410 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 450 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5410	450	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1470	122	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 6116 501 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 2949$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6116	9400	No
Fi F			
$v = v - v$	5615	9400	No
FO F R			
v	501	2100	No
R			
$v v$	1583 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2949	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 25.1$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.343$
S
Space mean speed in ramp influence area, $S = 57.1$ mph
R
Space mean speed in outer lanes, $S = 69.0$ mph
0
Space mean speed for all vehicles, $S = 62.7$ mph

Average passenger-car speed, S 57.0 mi/h
 Number of lanes, N 2
 Density, D 38.6 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3600 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 978 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2201 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2201 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3600 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 340 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3600	340	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	978	92	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4402	379	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4402$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4402	4700	No
Fi F			
$v = v - v$	4023	4700	No
FO F R			
v	379	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4402	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 39.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.332$
S
Space mean speed in ramp influence area, $S = 57.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3260 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 90 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3260	90	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	886	24	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3986	100	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3986 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4086	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3986	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.2 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.528
S
Space mean speed in ramp influence area, S = 52.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3350 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3350	330	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	910	90	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4096	368	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4096 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4464	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4096	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.0 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.615
S
Space mean speed in ramp influence area, S = 50.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 50.9 mph

Average passenger-car speed, S	55.6	mi/h
Number of lanes, N	2	
Density, D	40.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V	3680	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1000	v
Trucks and buses	25	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	2250	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h

Urban Freeway

LOS and Performance Measures

Flow rate, vp	2250	pc/h/ln
Free-flow speed, FFS	65.0	mi/h

Average passenger-car speed, S 56.9 mi/h
 Number of lanes, N 2
 Density, D 38.8 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3610 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 981 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2207 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2207 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3610 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 2000 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3610	2000	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	981	543	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.889 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 4414 2228 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4414$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4414	4700	No
Fi F			
$v = v - v$	2186	4700	No
FO F R			
v	2228	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4414	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 24.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.499$
S
Space mean speed in ramp influence area, $S = 53.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 53.5$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	1610 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	35.0 mph
Volume on ramp	10 vph
Length of first accel/decel lane	590 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	1610	10	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	437	3	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1969	11	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1969$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	1980	4700	No
FO			
v	1980	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.308
S
Space mean speed in ramp influence area, S = 57.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.9 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego DIAG ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1620 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 40 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1620	40	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	440	11	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1981	45	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1981$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2026	4700	No
FO			
v	2026	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.309
S
Space mean speed in ramp influence area, S = 57.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.9 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 15.6 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1660 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 451 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1015 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1015 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 9.3 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 990 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 269 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 605 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 605 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2660 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 723 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1503 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1503 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.6 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2710 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 736 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1532 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1532 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2710 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1170 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2710	1170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	736	318	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3063	1304	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3063$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3063	4700	No
Fi F			
$v = v - v$	1759	4700	No
FO F R			
v	1304	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3063	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 12.6$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.415$
S
Space mean speed in ramp influence area, $S = 55.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.4$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Loop On
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1540 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 880 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1540	880	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	418	239	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1741	980	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1741$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2721	4700	No
FO			
v	2721	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.339
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.2 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego DiagOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2420 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 700 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2420	700	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	658	190	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2736	780	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2736 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	3516	4700	No
FO			
v	3516	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.8 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.411
S
Space mean speed in ramp influence area, S = 55.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.5 mph

Average passenger-car speed, S 64.2 mi/h
 Number of lanes, N 2
 Density, D 27.5 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3120 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 848 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1763 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1763 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 63.7 mi/h
 Number of lanes, N 2
 Density, D 28.6 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3220 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 875 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1820 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1820 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3220 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 170 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3220	170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	875	46	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3640	189	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3640$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3640	4700	No
Fi F			
$v = v - v$	3451	4700	No
FO F R			
v	189	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3640	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 33.8$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.315$
S
Space mean speed in ramp influence area, $S = 57.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3050 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 870 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3050	870	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	829	236	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3448	969	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3448 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4417 4700 No
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3448	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.3 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.619
S
Space mean speed in ramp influence area, S = 50.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 50.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3920 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 10 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3920	10	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1065	3	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4431	11	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4431 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4442	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4431	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.0 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.607
S
Space mean speed in ramp influence area, S = 51.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.0 mph

Average passenger-car speed, S	56.5	mi/h
Number of lanes, N	2	
Density, D	39.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V	3930	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1068	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	2221	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h

Urban Freeway

LOS and Performance Measures

Flow rate, vp	2221	pc/h/ln
Free-flow speed, FFS	65.0	mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3930 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 865 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3930	865	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1068	235	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.962 0.990
Driver population factor, fP 1.00 1.00
Flow rate, vp 4443 950 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
v = v + (v - v) P = 4443 pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4443	4700	No
Fi F			
v = v - v	3493	4700	No
FO F R			
v	950	2200	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4443	4600	No
			!

Level of Service Determination (if not F)

Density, D = 4.252 + 0.0086 v - 0.009 L = 29.0 pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D = 0.123
S
Space mean speed in ramp influence area, S = 62.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 62.2 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2165 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 865 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2165	865	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	588	235	v
Trucks and buses	25	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2647	950	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 2647$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3597	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2647	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.268
S
Space mean speed in ramp influence area, S = 58.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.8 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2740 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 395 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2740	395	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	745	107	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.962 0.990
Driver population factor, fP 1.00 1.00
Flow rate, vp 3097 434 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3097$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3097	4700	No
Fi F			
$v = v - v$	2663	4700	No
FO F R			
v	434	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3097	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 17.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.077$
S
Space mean speed in ramp influence area, $S = 63.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 63.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3205 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 395 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3205	395	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	871	107	v
Trucks and buses	25	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3919	434	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3919$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4353	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3919	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 29.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.429
S
Space mean speed in ramp influence area, S = 55.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.1 mph

Leisch Method for Weaving Analysis

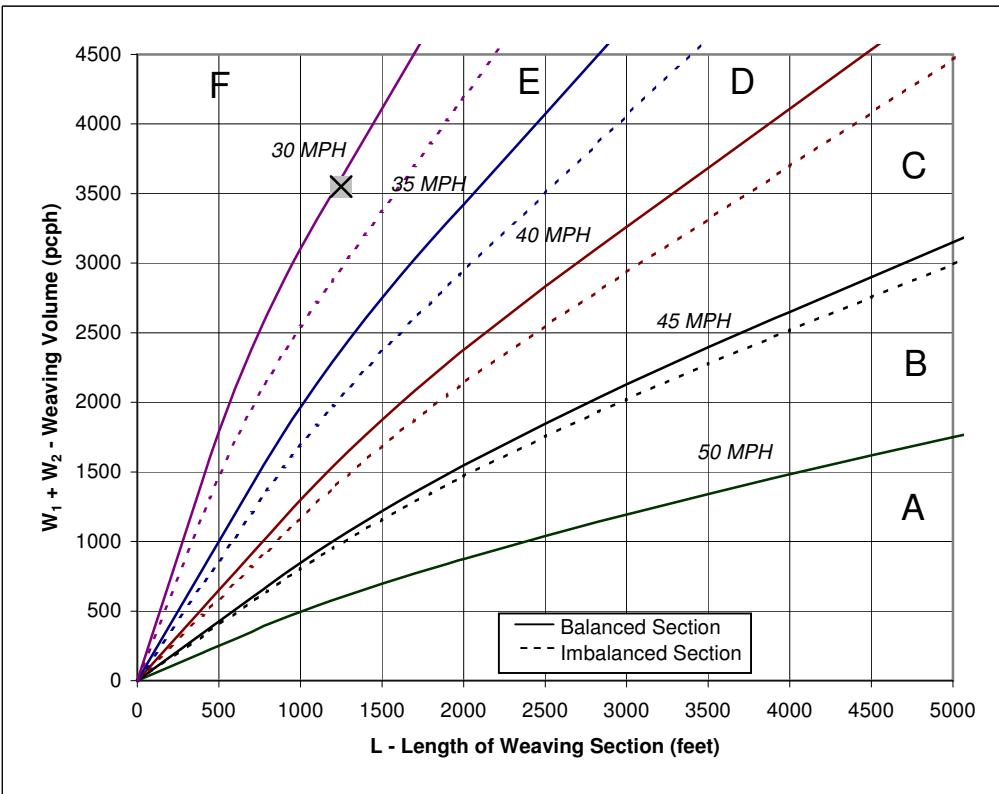
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

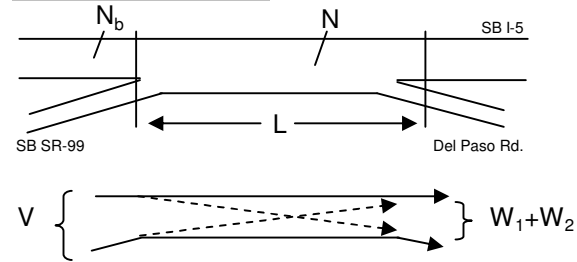
Project Information

Project	South Sutter County
Scenario	Existing PP- AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	5,410	3,065	450
Truck Percentage	8%	2%	2%
PCE for Trucks	1.5	1.5	1.5
Volume (pcph)	5,626	3,096	455



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **26.8**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **1,634**
- Level of Service (LOS) **E**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	5370	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	5370	3205
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.8889
----------	--------

v_i	6566.576	pc/hr/ln
-------	----------	----------

Density, D	23.9	pc/mi/ln
-------------------	------	----------

LOS	C
------------	---

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Existing PP AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 5920 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 350 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5920	350	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1526	90	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6347	370	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 3701$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6717	7050	No
$v v$	2646 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3701	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.532
S
Space mean speed in ramp influence area, S = 52.8 mph
R
Space mean speed in outer lanes, S = 56.4 mph
O
Space mean speed for all vehicles, S = 54.1 mph

Average passenger-car speed, S 55.9 mi/h
 Number of lanes, N 3
 Density, D 40.1 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 6270 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1616 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2241 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2241 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.8 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2395 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 617 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1284 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1284 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.2 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2811 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 724 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1507 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1507 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.9 mi/h
 Number of lanes, N 2
 Density, D 24.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2901 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 748 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1585 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1585 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2276 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 587 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1244 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1244 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 59.0 mi/h
 Number of lanes, N 3
 Density, D 36.0 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Del Paso Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5830 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1503 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2124 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2124 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 5830 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 840 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5830	840	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1503	216	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 6371 888 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 3279$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6371	9400	No
Fi F			
$v = v - v$	5483	9400	No
FO F R			
v	888	2100	No
R			
$v = v$	1546 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3279	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.0$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.378$
S
Space mean speed in ramp influence area, $S = 56.3$ mph
R
Space mean speed in outer lanes, $S = 69.2$ mph
0
Space mean speed for all vehicles, $S = 61.9$ mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4500 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1120 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4500	1120	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1160	289	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4825	1184	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4825$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4825	4700	Yes
Fi F			
$v = v - v$	3641	4700	No
FO F R			
v	1184	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4825	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 43.0$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.405$
S
Space mean speed in ramp influence area, $S = 55.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	3380 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	25.0 mph
Volume on ramp	360 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	3380	360	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	871	93	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3624	380	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3624 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4004	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3624	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.510
S
Space mean speed in ramp influence area, S = 53.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 53.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3740 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 240 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3740	240	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	964	62	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4010	254	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4010$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4264 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4010	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.553
S
Space mean speed in ramp influence area, S = 52.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.3 mph

Average passenger-car speed, S 58.7 mi/h
 Number of lanes, N 2
 Density, D 36.3 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3980 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1026 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2134 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2134 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 61.9 mi/h
 Number of lanes, N 2
 Density, D 31.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riega Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3680 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 948 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1973 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1973 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3680 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1740 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3680	1740	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	948	448	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3946	1839	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3946$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3946	4700	No
Fi F			
$v = v - v$	2107	4700	No
FO F R			
v	1839	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3946	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 20.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.464$
S
Space mean speed in ramp influence area, $S = 54.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.3$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1940 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 410 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1940	410	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	500	106	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2080	433	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2080$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2513	4700	No
FO			
v	2513	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.328
S
Space mean speed in ramp influence area, S = 57.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.5 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego DIAG ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2350 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 300 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	2350	300	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	606	77	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2520	317	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2520$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2837	4700	No
FO			
v	2837	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.346
S
Space mean speed in ramp influence area, S = 57.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.0 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 21.9 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riega Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2650 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 683 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1421 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1421 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.6 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2380 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 613 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1276 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1276 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 9.2 pc/mi/ln
 Level of service, LOS A

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1100 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 284 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 601 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 601 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 15.2 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1810 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 466 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 989 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 989 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1810 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1810	570	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	466	147	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 1978 602 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1978$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1978	4700	No
Fi F			
$v = v - v$	1376	4700	No
FO F R			
v	602	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1978	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 3.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, $D = 0.352$
S
Space mean speed in ramp influence area, $S = 56.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego LoopOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1240 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 1020 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	1240	1020	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	320	263	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1355	1078	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1355 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2433	4700	No
FO			
v	2433	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.3 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.324
S
Space mean speed in ramp influence area, S = 57.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.5 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego DiagOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2260 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 1740 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	2260	1740	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	582	448	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2470	1839	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2470$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4309	4700	No
FO			
v	4309	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.570
S
Space mean speed in ramp influence area, S = 51.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.9 mph

Average passenger-car speed, S 57.4 mi/h
 Number of lanes, N 2
 Density, D 38.1 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4000 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1031 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2186 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2186 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S	58.5	mi/h
Number of lanes, N	2	
Density, D	36.6	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V	3920	veh/h
Peak-hour factor, PHF	0.97	
Peak 15-min volume, v15	1010	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2142	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h

Urban Freeway

LOS and Performance Measures

Flow rate, vp	2142	pc/h/ln
Free-flow speed, FFS	65.0	mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3920 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 440 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3920	440	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1010	113	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4284		465		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4284$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4284	4700	No
Fi F			
$v = v - v$	3819	4700	No
FO F R			
v	465	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4284	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 39.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.340$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3480 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 360 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3480	360	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	897	93	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3803	380	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3803$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4183	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3803	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.552
S
Space mean speed in ramp influence area, S = 52.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3840 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 130 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3840	130	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	990	34	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4196	137	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4196$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4333	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4196	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.573
S
Space mean speed in ramp influence area, S = 51.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.8 mph

Average passenger-car speed, S 57.9 mi/h
 Number of lanes, N 2
 Density, D 37.5 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Existing PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3970 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1023 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2169 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2169 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3970 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 416 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3970	416	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1023	107	v
Trucks and buses	12	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.990
Driver population factor, fP 1.00 1.00
Flow rate, vp 4338 433 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4338$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4338	4700	No
Fi F			
$v = v - v$	3905	4700	No
FO F R			
v	433	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4338	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.077$
S
Space mean speed in ramp influence area, $S = 63.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 63.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	2395 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	416 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	2395	416	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	617	107	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2568	433	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 2568 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3001	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2568	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.3 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.204
S
Space mean speed in ramp influence area, S = 60.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 60.3 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2901 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 625 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2901	625	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	748	161	v
Trucks and buses	12	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.990		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3170		651		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3170$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3170	4700	No
Fi F			
$v = v - v$	2519	4700	No
FO F R			
v	651	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3170	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 18.0$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.097$
S
Space mean speed in ramp influence area, $S = 62.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Existing PP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3875 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 625 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3875	625	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	999	161	v
Trucks and buses	8	2	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4155	651	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 4155 \text{ pc/h}$
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4806	4700	Yes
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700 \text{ pc/h?}$		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4155	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.3 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.603
S
Space mean speed in ramp influence area, S = 51.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.1 mph

Leisch Method for Weaving Analysis

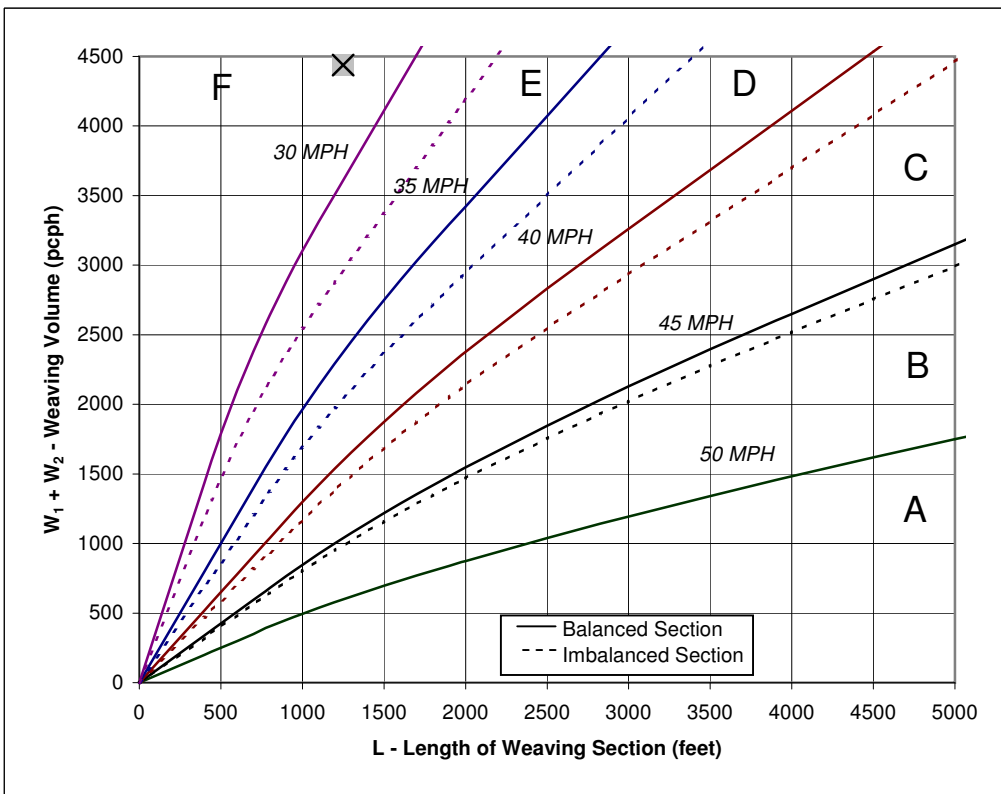
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

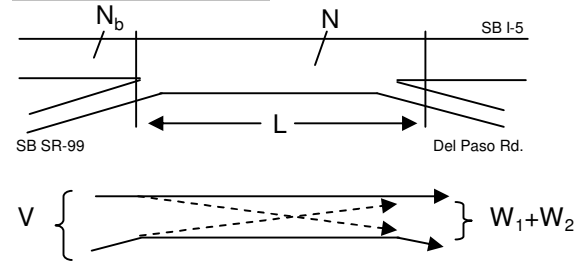
Project Information

Project	South Sutter County
Scenario	Existing PP - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,830	Volume (vph)*	3,554	Volume (vph)*	840
Truck Percentage	12%	Truck Percentage	2%	Truck Percentage	2%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	6,180	Volume (pcph)	3,590	Volume (pcph)	848



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **22.0**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **1,969**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	6270	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	6270	3875
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.9615
----------	--------

v_i	6722.474	pc/hr/ln
-------	----------	----------

Density, D	24.4	pc/mi/ln
-------------------	------	----------

LOS	C
------------	---

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Existing PP PM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



CUMULATIVE CONDITIONS

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd
























South Sutter
 Cumulative Conditions - AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	10	10	10	10	10	10
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)	11	11	11	11	11	11	11	11	11	11	11	11
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	92	82	16	92	82	16	22			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92	82	16	92	82	16	22			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	864	798	1063	864	798	1063	1594			1594		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	33	33	33	33								
Volume Left	11	11	11	11								
Volume Right	11	11	11	11								
cSH	895	895	1594	1594								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	1								
Control Delay (s)	9.2	9.2	2.5	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	2.5	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization			13.3%				ICU Level of Service			A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

South Sutter
Cumulative Conditions - AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	450	10	70	10	1280	20	100	2580	10
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)	11	11	11	489	11	76	11	1391	22	109	2804	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		1			1							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3745	4435	1402	3038	4435	696	2804			1391		
vC1, stage 1 conf vol	3022	3022		1413	1413							
vC2, stage 2 conf vol	723	1413		1625	3022							
vCu, unblocked vol	3745	4435	1402	3038	4435	696	2804			1391		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	35	92	0	0	80	92			78		
cM capacity (veh/h)	9	17	129	23	11	384	136			488		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	22	11	489	11	76	11	696	696	22	109	1402	1402
Volume Left	11	0	489	0	0	11	0	0	0	109	0	0
Volume Right	0	11	0	0	76	0	0	0	22	0	0	0
cSH	11	129	23	11	384	136	1700	1700	1700	488	1700	1700
Volume to Capacity	1.89	0.08	21.65	1.02	0.20	0.08	0.41	0.41	0.01	0.22	0.82	0.82
Queue Length 95th (ft)	89	7	Err	51	18	6	0	0	0	21	0	0
Control Delay (s)	1073.4	35.3	Err	737.4	16.7	33.9	0.0	0.0	0.0	14.5	0.0	0.0
Lane LOS	F	E	F	F	C	D				B		
Approach Delay (s)	727.4		8505.8			0.3				0.5		
Approach LOS	F		F									
Intersection Summary												
Average Delay			993.8									
Intersection Capacity Utilization			116.2%			ICU Level of Service				H		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 3: Sankey Rd & Road "H"

South Sutter
 Cumulative Conditions - AM Peak



















Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	↩
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	60	80	50	520	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	87	54	565	11	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			152		783	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			152		783	109
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		97	99
cM capacity (veh/h)			1429		349	945

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	152	620	22
Volume Left	0	54	11
Volume Right	87	0	11
cSH	1700	1429	510
Volume to Capacity	0.09	0.04	0.04
Queue Length 95th (ft)	0	3	3
Control Delay (s)	0.0	1.1	12.4
Lane LOS		A	B
Approach Delay (s)	0.0	1.1	12.4
Approach LOS			B

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)		15	






















HCM Unsignalized Intersection Capacity Analysis
 4: Riego Rd & Power Line Rd

South Sutter
 Cumulative Conditions - AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	20	60	80	10	10	10	10	10	10	10
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)	11	22	22	65	87	11	11	11	11	11	11	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	54	163	33	33								
Volume Left (vph)	11	65	11	11								
Volume Right (vph)	22	11	11	11								
Hadj (s)	-0.17	0.07	-0.10	-0.10								
Departure Headway (s)	4.0	4.2	4.3	4.3								
Degree Utilization, x	0.06	0.19	0.04	0.04								
Capacity (veh/h)	864	845	786	780								
Control Delay (s)	7.3	8.1	7.5	7.5								
Approach Delay (s)	7.3	8.1	7.5	7.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				7.8								
HCM Level of Service				A								
Intersection Capacity Utilization				24.8%	ICU Level of Service							A
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

South Sutter
Cumulative Conditions - AM Peak

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1716		1681	1692		1770	2888	1583	1770	3343	1583
Flt Permitted		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1716		1681	1692		1770	2888	1583	1770	3343	1583
Volume (vph)	10	10	20	1030	110	30	10	1270	610	60	2950	30
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)	11	11	22	1120	120	33	11	1380	663	65	3207	33
RTOR Reduction (vph)	0	21	0	0	1	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	23	0	629	643	0	11	1380	663	65	3207	33
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Split		Prot		Free		Prot		Free	
Protected Phases	4	4	8		8		5	2	1		6	
Permitted Phases							Free				Free	
Actuated Green, G (s)	6.3		35.1		35.1		1.5	75.7	139.1	6.0	80.2	139.1
Effective Green, g (s)	6.3		35.1		35.1		1.5	75.7	139.1	6.0	80.2	139.1
Actuated g/C Ratio	0.05		0.25		0.25		0.01	0.54	1.00	0.04	0.58	1.00
Clearance Time (s)	4.0		4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	78		424		427		19	1572	1583	76	1927	1583
v/s Ratio Prot	0.01		0.37		c0.38		0.01	0.48		c0.04	c0.96	
v/s Ratio Perm							c0.42				0.02	
v/c Ratio	0.29		1.48		1.50		0.58	0.88	0.42	0.86	1.66	0.02
Uniform Delay, d1	64.3		52.0		52.0		68.5	27.7	0.0	66.1	29.4	0.0
Progression Factor	1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1		229.9		239.1		36.3	5.9	0.8	56.8	301.2	0.0
Delay (s)	66.4		281.9		291.1		104.8	33.6	0.8	122.9	330.7	0.0
Level of Service	E		F		F		F	C	A	F	F	A
Approach Delay (s)	66.4		286.5				23.4				323.3	
Approach LOS	E		F				C				F	
Intersection Summary												
HCM Average Control Delay	222.3		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.52											
Actuated Cycle Length (s)	139.1		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	127.2%		ICU Level of Service				H					
Analysis Period (min)	15											

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

South Sutter
Cumulative Conditions - AM Peak



















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	80	600	1130	50	30	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	652	1228	54	33	22
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	1283				2082	1255
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1283				2082	1255
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				34	90
cM capacity (veh/h)	541				49	209

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	739	1283	54
Volume Left	87	0	33
Volume Right	0	54	22
cSH	541	1700	71
Volume to Capacity	0.16	0.75	0.77
Queue Length 95th (ft)	14	0	90
Control Delay (s)	4.5	0.0	146.2
Lane LOS	A		F
Approach Delay (s)	4.5	0.0	146.2
Approach LOS			F

Intersection Summary			
Average Delay		5.4	
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

South Sutter
Cumulative Conditions - AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	630	10	40	1170	10	10	10	20	10	20	10
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)	11	685	11	43	1272	11	11	11	22	11	22	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	707	1326	43	43								
Volume Left (vph)	11	43	11	11								
Volume Right (vph)	11	11	22	11								
Hadj (s)	0.03	0.04	-0.22	-0.07								
Departure Headway (s)	5.1	5.2	7.0	7.1								
Degree Utilization, x	1.00	1.90	0.08	0.09								
Capacity (veh/h)	696	713	503	487								
Control Delay (s)	56.5	424.6	10.6	10.8								
Approach Delay (s)	56.5	424.6	10.6	10.8								
Approach LOS	F	F	B	B								
Intersection Summary												
Delay			284.9									
HCM Level of Service			F									
Intersection Capacity Utilization			94.6%	ICU Level of Service	F							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

South Sutter
 Cumulative Conditions - AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↗	↗
Sign Control		Stop	Stop		Stop	
Volume (vph)	10	650	1200	150	210	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	707	1304	163	228	22

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total (vph)	717	1304	163	250
Volume Left (vph)	11	0	0	228
Volume Right (vph)	0	0	163	22
Hadj (s)	0.04	0.03	-0.67	0.16
Departure Headway (s)	6.0	6.3	5.6	7.1
Degree Utilization, x	1.19	2.29	0.25	0.50
Capacity (veh/h)	592	581	633	501
Control Delay (s)	123.0	599.8	9.3	16.9
Approach Delay (s)	123.0	534.2		16.9
Approach LOS	F	F		C

Intersection Summary			
Delay		359.9	
HCM Level of Service		F	
Intersection Capacity Utilization		82.7%	ICU Level of Service E
Analysis Period (min)		15	

















HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

South Sutter
 Cumulative Conditions - AM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	↗
Sign Control	Stop			Stop	Stop	
Volume (vph)	750	110	60	1270	80	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	815	120	65	1380	87	22
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	815	120	1446	109		
Volume Left (vph)	0	0	65	87		
Volume Right (vph)	0	120	0	22		
Hadj (s)	0.03	-0.67	0.04	0.07		
Departure Headway (s)	5.6	4.9	5.3	7.0		
Degree Utilization, x	1.26	0.16	2.13	0.21		
Capacity (veh/h)	641	728	690	505		
Control Delay (s)	148.2	7.6	528.3	11.9		
Approach Delay (s)	130.2		528.3	11.9		
Approach LOS	F		F	B		
Intersection Summary						
Delay			356.3			
HCM Level of Service			F			
Intersection Capacity Utilization			125.3%	ICU Level of Service	H	
Analysis Period (min)			15			






























HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

South Sutter
 Cumulative Conditions - AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	740	20	90	1280	40	40	10	50	30	10	10
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)	11	804	22	98	1391	43	43	11	54	33	11	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	837	1533	109	54								
Volume Left (vph)	11	98	43	33								
Volume Right (vph)	22	43	54	11								
Hadj (s)	0.02	0.03	-0.19	0.03								
Departure Headway (s)	5.5	5.5	7.1	7.6								
Degree Utilization, x	1.27	2.33	0.21	0.11								
Capacity (veh/h)	653	660	497	456								
Control Delay (s)	152.5	617.6	12.0	11.5								
Approach Delay (s)	152.5	617.6	12.0	11.5								
Approach LOS	F	F	B	B								
Intersection Summary												
Delay			424.9									
HCM Level of Service			F									
Intersection Capacity Utilization			131.7%	ICU Level of Service	H							
Analysis Period (min)			15									



































HCM Signalized Intersection Capacity Analysis
11: Baseline Rd & Brewer Rd

South Sutter
Cumulative Conditions - AM Peak

													
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	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	4.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	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	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	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583	1583
Volume (vph)	20	730	40	170	1300	30	50	40	250	120	50	10	10
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	0.92
Adj. Flow (vph)	22	793	43	185	1413	33	54	43	272	130	54	11	11
RTOR Reduction (vph)	0	0	30	0	0	19	0	0	165	0	0	8	8
Lane Group Flow (vph)	22	793	13	185	1413	14	54	43	107	130	54	3	3
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
Protected Phases	5	2		1	6		3	8		7		4	
Permitted Phases			2			6			8				4
Actuated Green, G (s)	0.6	18.7	18.7	9.3	27.4	27.4	3.4	12.7	12.7	6.2	15.5	15.5	15.5
Effective Green, g (s)	0.6	18.7	18.7	9.3	27.4	27.4	3.4	12.7	12.7	6.2	15.5	15.5	15.5
Actuated g/C Ratio	0.01	0.30	0.30	0.15	0.44	0.44	0.05	0.20	0.20	0.10	0.25	0.25	0.25
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	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	3.0
Lane Grp Cap (vph)	17	1512	471	262	2215	690	96	376	320	174	459	390	390
v/s Ratio Prot	0.01	0.16		c0.10	c0.28		0.03	0.02		c0.07	c0.03		
v/s Ratio Perm			0.01			0.01			c0.07			0.00	
v/c Ratio	1.29	0.52	0.03	0.71	0.64	0.02	0.56	0.11	0.33	0.75	0.12	0.01	0.01
Uniform Delay, d1	31.1	18.4	15.7	25.5	13.9	10.1	29.0	20.5	21.5	27.6	18.4	17.9	17.9
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	1.00
Incremental Delay, d2	323.2	0.3	0.0	8.4	1.4	0.1	7.3	0.1	0.6	25.0	0.1	0.0	0.0
Delay (s)	354.3	18.7	15.7	33.9	15.3	10.2	36.4	20.6	22.1	52.6	18.5	17.9	17.9
Level of Service	F	B	B	C	B	B	D	C	C	D	B	B	B
Approach Delay (s)		27.2			17.3			24.0			41.2		
Approach LOS		C			B			C			D		
Intersection Summary													
HCM Average Control Delay			22.4				HCM Level of Service			C			
HCM Volume to Capacity ratio			0.60										
Actuated Cycle Length (s)			62.9				Sum of lost time (s)		16.0				
Intersection Capacity Utilization			51.8%				ICU Level of Service		A				
Analysis Period (min)			15										
c	Critical Lane Group												
































HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

South Sutter
 Cumulative Conditions - AM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	790	1330	110	650	1510	20	120	1010	620	30	930	900
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)	859	1446	120	707	1641	22	130	1098	674	33	1011	978
RTOR Reduction (vph)	0	0	49	0	0	10	0	0	295	0	0	291
Lane Group Flow (vph)	859	1446	71	707	1641	12	130	1098	379	33	1011	687
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	29.0	39.6	39.6	28.8	39.0	39.0	4.0	47.9	47.9	2.4	46.3	46.3
Effective Green, g (s)	29.0	41.6	41.6	28.4	41.0	41.0	4.0	48.2	48.2	2.4	46.6	46.6
Actuated g/C Ratio	0.21	0.30	0.30	0.21	0.30	0.30	0.03	0.35	0.35	0.02	0.34	0.34
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.3
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	729	1549	482	714	1526	475	101	1794	559	60	1735	540
v/s Ratio Prot	c0.25	0.28		0.21	c0.32		c0.04	0.22		0.01	0.20	
v/s Ratio Perm			0.05			0.01			0.24			c0.43
v/c Ratio	1.18	0.93	0.15	0.99	1.08	0.02	1.29	0.61	0.68	0.55	0.58	1.27
Uniform Delay, d1	53.8	46.2	34.6	54.0	47.8	33.7	66.3	36.5	37.6	66.6	37.0	45.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	94.2	10.5	0.1	31.1	46.3	0.0	185.0	0.4	2.6	10.5	0.3	136.3
Delay (s)	148.0	56.7	34.6	85.0	94.1	33.7	251.3	36.9	40.2	77.0	37.3	181.3
Level of Service	F	E	C	F	F	C	F	D	D	E	D	F
Approach Delay (s)		87.9			90.8			52.7			107.6	
Approach LOS		F			F			D			F	
Intersection Summary												
HCM Average Control Delay			85.6	HCM Level of Service				F				
HCM Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			136.6	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			98.3%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Signalized Intersection Capacity Analysis
13: Baseline Rd & Fiddymnt Rd

South Sutter
Cumulative Conditions - AM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	370	1030	40	270	1020	370	10	1170	280	300	800	640
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)	402	1120	43	293	1109	402	11	1272	304	326	870	696
RTOR Reduction (vph)	0	0	30	0	0	96	0	0	166	0	0	182
Lane Group Flow (vph)	402	1120	13	293	1109	306	11	1272	138	326	870	514
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	12.0	30.2	30.2	10.8	29.0	29.0	0.6	37.2	37.2	10.0	46.6	46.6
Effective Green, g (s)	12.0	32.2	32.2	10.8	31.0	31.0	0.6	39.2	39.2	10.0	48.6	48.6
Actuated g/C Ratio	0.11	0.30	0.30	0.10	0.29	0.29	0.01	0.36	0.36	0.09	0.45	0.45
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	381	1513	471	343	1457	454	19	1282	574	317	1590	711
v/s Ratio Prot	c0.12	c0.22		0.09	0.22		0.00	c0.36		c0.09	0.25	
v/s Ratio Perm			0.01			0.19			0.09			0.32
v/c Ratio	1.06	0.74	0.03	0.85	0.76	0.67	0.58	0.99	0.24	1.03	0.55	0.72
Uniform Delay, d1	48.1	34.2	26.9	47.9	35.2	34.1	53.7	34.3	24.1	49.1	21.8	24.3
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	61.4	2.3	0.0	17.7	2.8	4.9	23.8	23.2	0.4	58.0	0.6	4.3
Delay (s)	109.5	36.6	27.0	65.6	38.0	39.1	77.5	57.6	24.5	107.1	22.4	28.7
Level of Service	F	D	C	E	D	D	E	E	C	F	C	C
Approach Delay (s)		55.0			42.7			51.4			39.3	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay			46.6	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			108.2	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			84.5%	ICU Level of Service				E				
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

South Sutter
 Cumulative Conditions - AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	4	23	37	8	6	2	3	25	30	5
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)	11	22	4	25	40	9	7	2	3	27	33	5
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	37	74	12	65								
Volume Left (vph)	11	25	7	27								
Volume Right (vph)	4	9	3	5								
Hadj (s)	0.02	0.03	-0.02	0.07								
Departure Headway (s)	4.2	4.1	4.2	4.2								
Degree Utilization, x	0.04	0.08	0.01	0.08								
Capacity (veh/h)	840	849	824	828								
Control Delay (s)	7.4	7.5	7.2	7.6								
Approach Delay (s)	7.4	7.5	7.2	7.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.5									
HCM Level of Service			A									
Intersection Capacity Utilization			15.5%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

South Sutter
 Cumulative Conditions - AM Peak

												
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	370	10	0	880	110	0	0	160	0	0	70
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	402	11	0	957	120	0	0	174	0	0	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.46						0.46	0.46		0.46	0.46	0.46
vC, conflicting volume	1076			413			1500	1484	408	1598	1429	1016
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1166			413			2094	2058	408	2308	1939	1036
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			100			100	100	73	100	100	41
cM capacity (veh/h)	274			1146			7	25	644	9	30	129
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	413	1076	174	76								
Volume Left	0	0	0	0								
Volume Right	11	120	174	76								
cSH	1700	1700	644	129								
Volume to Capacity	0.24	0.63	0.27	0.59								
Queue Length 95th (ft)	0	0	27	75								
Control Delay (s)	0.0	0.0	12.7	67.2								
Lane LOS			B	F								
Approach Delay (s)	0.0	0.0	12.7	67.2								
Approach LOS			B	F								
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			64.0%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

South Sutter
 Cumulative Conditions - AM Peak



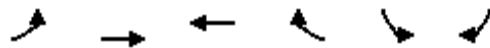
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑↑	↑	↗	↘↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.94	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	1863	1583	1700	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	1863	1583	1700	
Volume (vph)	80	450	920	20	80	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	489	1000	22	87	76
RTOR Reduction (vph)	0	0	0	9	37	0
Lane Group Flow (vph)	87	489	1000	13	126	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		4	
Permitted Phases				6		
Actuated Green, G (s)	4.3	50.1	41.8	41.8	11.1	
Effective Green, g (s)	4.3	50.1	41.8	41.8	11.1	
Actuated g/C Ratio	0.06	0.72	0.60	0.60	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)	110	2562	1125	956	273	
v/s Ratio Prot	c0.05	0.14	c0.54		c0.07	
v/s Ratio Perm				0.01		
v/c Ratio	0.79	0.19	0.89	0.01	0.46	
Uniform Delay, d1	32.0	3.1	11.7	5.5	26.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	31.0	0.0	8.8	0.0	1.2	
Delay (s)	63.0	3.1	20.5	5.5	27.6	
Level of Service	E	A	C	A	C	
Approach Delay (s)		12.1	20.2		27.6	
Approach LOS		B	C		C	

Intersection Summary

HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

South Sutter
 Cumulative Conditions - AM Peak



































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	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)	270	800	1180	230	260	460
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	293	870	1283	250	283	500
RTOR Reduction (vph)	0	0	0	146	0	272
Lane Group Flow (vph)	293	870	1283	104	283	228
Turn Type	Prot		Perm		Perm	
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	17.1	58.1	37.0	37.0	23.0	23.0
Effective Green, g (s)	17.1	58.1	37.0	37.0	23.0	23.0
Actuated g/C Ratio	0.19	0.65	0.42	0.42	0.26	0.26
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)	340	2308	1470	657	457	409
v/s Ratio Prot	c0.17	0.25	c0.36		c0.16	
v/s Ratio Perm				0.07		0.14
v/c Ratio	0.86	0.38	0.87	0.16	0.62	0.56
Uniform Delay, d1	34.9	7.2	23.9	16.3	29.2	28.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.5	0.1	7.4	0.5	6.2	5.4
Delay (s)	54.4	7.3	31.3	16.8	35.4	34.0
Level of Service	D	A	C	B	D	C
Approach Delay (s)		19.1	29.0		34.5	
Approach LOS		B	C		C	

Intersection Summary

HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	89.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



































HCM Signalized Intersection Capacity Analysis
19: Elverta Rd & 16th St

South Sutter
Cumulative Conditions - AM Peak

												
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	210	730	250	150	1090	240	150	230	90	150	330	210
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)	228	793	272	163	1185	261	163	250	98	163	359	228
RTOR Reduction (vph)	0	0	176	0	0	163	0	0	70	0	0	130
Lane Group Flow (vph)	228	793	96	163	1185	98	163	250	28	163	359	98
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	6.0	28.3	28.3	7.7	30.0	30.0	5.0	23.0	23.0	5.0	23.0	23.0
Effective Green, g (s)	6.0	28.3	28.3	7.7	30.0	30.0	5.0	23.0	23.0	5.0	23.0	23.0
Actuated g/C Ratio	0.08	0.35	0.35	0.10	0.38	0.38	0.06	0.29	0.29	0.06	0.29	0.29
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)	257	1252	560	330	1327	594	215	1017	455	215	1017	455
v/s Ratio Prot	c0.07	0.22		0.05	c0.33		c0.05	0.07		0.05	c0.10	
v/s Ratio Perm			0.06			0.06			0.02			0.06
v/c Ratio	0.89	0.63	0.17	0.49	0.89	0.16	0.76	0.25	0.06	0.76	0.35	0.22
Uniform Delay, d1	36.7	21.5	17.8	34.3	23.5	16.7	36.9	21.9	20.7	36.9	22.6	21.7
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	28.5	2.4	0.7	1.2	9.5	0.6	14.2	0.6	0.3	14.2	1.0	1.1
Delay (s)	65.2	24.0	18.5	35.5	33.0	17.3	51.1	22.4	20.9	51.1	23.6	22.7
Level of Service	E	C	B	D	C	B	D	C	C	D	C	C
Approach Delay (s)		30.1			30.7			31.3			29.3	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay	30.3			HCM Level of Service				C				
HCM Volume to Capacity ratio	0.65											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)				12.0				
Intersection Capacity Utilization	62.9%			ICU Level of Service				B				
Analysis Period (min)	15											
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

South Sutter
Cumulative Conditions - AM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	770	350	450	410	810	410	620	1180	100	220	1370	770
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)	837	380	489	446	880	446	674	1283	109	239	1489	837
RTOR Reduction (vph)	0	0	163	0	0	162	0	0	62	0	0	233
Lane Group Flow (vph)	837	380	326	446	880	284	674	1283	47	239	1489	604
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	26.5	38.6	38.6	20.0	32.4	32.4	21.5	50.9	50.9	12.9	42.3	42.3
Effective Green, g (s)	28.0	40.3	40.3	21.5	33.8	33.8	23.0	52.6	52.6	14.4	44.0	44.0
Actuated g/C Ratio	0.19	0.28	0.28	0.15	0.23	0.23	0.16	0.36	0.36	0.10	0.30	0.30
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	664	1415	441	510	1187	370	545	1847	575	341	1545	481
v/s Ratio Prot	c0.24	0.07		0.13	0.17		c0.20	0.25		0.07	0.29	
v/s Ratio Perm			c0.21			0.18			0.03			c0.38
v/c Ratio	1.26	0.27	0.74	0.87	0.74	0.77	1.24	0.69	0.08	0.70	0.96	1.26
Uniform Delay, d1	58.4	40.8	47.5	60.3	51.4	51.8	60.9	39.3	30.3	63.1	49.6	50.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	129.2	0.3	8.6	14.9	3.0	10.8	121.6	1.6	0.1	5.2	15.4	131.6
Delay (s)	187.6	41.0	56.0	75.2	54.5	62.7	182.5	40.8	30.4	68.4	65.0	182.0
Level of Service	F	D	E	E	D	E	F	D	C	E	E	F
Approach Delay (s)		117.2			61.8			86.5			103.5	
Approach LOS		F			E			F			F	
Intersection Summary												
HCM Average Control Delay			92.9				HCM Level of Service			F		
HCM Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			144.8				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			95.1%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

South Sutter
 Cumulative Conditions - AM Peak

													
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	
Lane Util. Factor		0.91	1.00		0.95	1.00				0.97		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		5085	1583		3539	1583				3433		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		5085	1583		3539	1583				3433		1583	
Volume (vph)	0	400	160	0	610	930	0	0	0	210	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	435	174	0	663	1011	0	0	0	228	0	261	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	63	
Lane Group Flow (vph)	0	435	174	0	663	1011	0	0	0	228	0	198	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4	
Actuated Green, G (s)		23.6	43.9		23.6	43.9				12.3		12.3	
Effective Green, g (s)		23.6	43.9		23.6	43.9				12.3		12.3	
Actuated g/C Ratio		0.54	1.00		0.54	1.00				0.28		0.28	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2734	1583		1903	1583				962		444	
v/s Ratio Prot		0.09			0.19					0.07			
v/s Ratio Perm			0.11			0.64						0.12	
v/c Ratio		0.16	0.11		0.35	0.64				0.24		0.45	
Uniform Delay, d1		5.1	0.0		5.8	0.0				12.2		13.0	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.1		0.5	2.0				0.1		0.7	
Delay (s)		5.2	0.1		6.3	2.0				12.3		13.7	
Level of Service		A	A		A	A				B		B	
Approach Delay (s)		3.7			3.7			0.0			13.1		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			5.3									HCM Level of Service	A
HCM Volume to Capacity ratio			0.64										
Actuated Cycle Length (s)			43.9									Sum of lost time (s)	0.0
Intersection Capacity Utilization			38.4%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

South Sutter
 Cumulative Conditions - AM Peak

												
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		0.95	1.00		0.91	1.00	0.97		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3539	1583		5085	1583	3433		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3539	1583		5085	1583	3433		1583			
Volume (vph)	0	490	120	0	1450	280	90	0	480	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)	0	533	130	0	1576	304	98	0	522	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	533	130	0	1576	304	98	0	522	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		42.7	60.9		42.7	60.9	10.2		60.9			
Effective Green, g (s)		42.7	60.9		42.7	60.9	10.2		60.9			
Actuated g/C Ratio		0.70	1.00		0.70	1.00	0.17		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2481	1583		3565	1583	575		1583			
v/s Ratio Prot		0.15			c0.31		0.03					
v/s Ratio Perm			0.08			0.19			c0.33			
v/c Ratio		0.21	0.08		0.44	0.19	0.17		0.33			
Uniform Delay, d1		3.2	0.0		3.9	0.0	21.7		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.2	0.1		0.1	0.3	0.1		0.6			
Delay (s)		3.4	0.1		4.0	0.3	21.9		0.6			
Level of Service		A	A		A	A	C		A			
Approach Delay (s)		2.8			3.4			3.9			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			3.4				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			60.9				Sum of lost time (s)		4.0			
Intersection Capacity Utilization			38.0%				ICU Level of Service		A			
Analysis Period (min)			15									
c	Critical Lane Group											

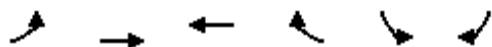
HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

South Sutter
 Cumulative Conditions - AM Peak

	→	↘	↙	←	↖	↗
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	0.91	1.00	1.00	0.91	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	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	1770	5085	1770	1583
Volume (vph)	560	110	920	1230	140	450
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	609	120	1000	1337	152	489
RTOR Reduction (vph)	0	98	0	0	0	435
Lane Group Flow (vph)	609	22	1000	1337	152	54
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	4	
Permitted Phases		2				4
Actuated Green, G (s)	21.1	21.1	77.0	101.6	14.4	14.4
Effective Green, g (s)	22.6	22.6	76.5	103.1	13.9	13.9
Actuated g/C Ratio	0.18	0.18	0.61	0.82	0.11	0.11
Clearance Time (s)	5.5	5.5	3.5	5.5	3.5	3.5
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	919	286	1083	4194	197	176
v/s Ratio Prot	c0.12		c0.57	0.26	c0.09	
v/s Ratio Perm		0.01				0.03
v/c Ratio	0.66	0.08	0.92	0.32	0.77	0.31
Uniform Delay, d1	47.7	42.5	21.6	2.6	54.0	51.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.1	12.6	0.0	15.5	0.4
Delay (s)	49.5	42.6	34.2	2.6	69.6	51.5
Level of Service	D	D	C	A	E	D
Approach Delay (s)	48.3			16.1	55.8	
Approach LOS	D			B	E	
Intersection Summary						
HCM Average Control Delay			29.3		HCM Level of Service	C
HCM Volume to Capacity ratio			0.85			
Actuated Cycle Length (s)			125.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			79.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

South Sutter
 Cumulative Conditions - AM Peak















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	4.0
Lane Util. Factor	1.00	0.91	0.91	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	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	120	1070	1970	10	30	130
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	1163	2141	11	33	141
RTOR Reduction (vph)	0	0	0	5	0	121
Lane Group Flow (vph)	130	1163	2141	6	33	20
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		8	
Permitted Phases				6		8
Actuated Green, G (s)	8.1	55.1	43.0	43.0	10.2	10.2
Effective Green, g (s)	8.1	55.1	43.0	43.0	10.2	10.2
Actuated g/C Ratio	0.11	0.75	0.59	0.59	0.14	0.14
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)	196	3822	2983	929	246	220
v/s Ratio Prot	c0.07	0.23	c0.42		c0.02	
v/s Ratio Perm				0.00		0.01
v/c Ratio	0.66	0.30	0.72	0.01	0.13	0.09
Uniform Delay, d1	31.3	2.9	10.8	6.3	27.7	27.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	0.0	0.8	0.0	0.2	0.2
Delay (s)	39.5	3.0	11.7	6.3	27.9	27.7
Level of Service	D	A	B	A	C	C
Approach Delay (s)		6.6	11.6		27.7	
Approach LOS		A	B		C	

Intersection Summary

HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	73.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			













HCM Signalized Intersection Capacity Analysis
64: Elverta Rd & SB Ramps

South Sutter
Cumulative Conditions - AM Peak

												
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
Lane Util. Factor		0.95	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)		3539	1583		1863	1583				1770	1770	1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)		3539	1583		1863	1583				1770	1770	1583
Volume (vph)	0	120	20	0	570	600	0	0	0	70	0	320
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	130	22	0	620	652	0	0	0	76	0	348
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	162
Lane Group Flow (vph)	0	130	22	0	620	652	0	0	0	76	0	186
Turn Type		Free			Free					Prot	custom	
Protected Phases		2			6					8		
Permitted Phases		Free			Free					8		
Actuated Green, G (s)		28.5	47.2		28.5	47.2				10.7	10.7	10.7
Effective Green, g (s)		28.5	47.2		28.5	47.2				10.7	10.7	10.7
Actuated g/C Ratio		0.60	1.00		0.60	1.00				0.23	0.23	0.23
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)		2137	1583		1125	1583				401		359
v/s Ratio Prot		0.04			c0.33					0.04		
v/s Ratio Perm			0.01			c0.41						0.12
v/c Ratio		0.06	0.01		0.55	0.41				0.19		0.52
Uniform Delay, d1		3.8	0.0		5.6	0.0				14.7		16.0
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.0	0.0		1.9	0.8				0.2		1.3
Delay (s)		3.9	0.0		7.5	0.8				15.0		17.3
Level of Service		A	A		A	A				B		B
Approach Delay (s)		3.3			4.1			0.0			16.9	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM Average Control Delay		6.9			HCM Level of Service			A				
HCM Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		47.2			Sum of lost time (s)			4.0				
Intersection Capacity Utilization		56.5%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
65: Elverta Rd & NB Ramps

South Sutter
Cumulative Conditions - AM Peak

												
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	1.00		0.95	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		3539	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		3539	1583	1770		1583			
Volume (vph)	0	120	70	0	880	30	290	0	270	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)	0	130	76	0	957	33	315	0	293	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	130	76	0	957	33	315	0	293	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		25.9	47.3		25.9	47.3	13.4		47.3			
Effective Green, g (s)		25.9	47.3		25.9	47.3	13.4		47.3			
Actuated g/C Ratio		0.55	1.00		0.55	1.00	0.28		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1020	1583		1938	1583	501		1583			
v/s Ratio Prot		0.07			c0.27		c0.18					
v/s Ratio Perm			0.05			0.02			0.19			
v/c Ratio		0.13	0.05		0.49	0.02	0.63		0.19			
Uniform Delay, d1		5.2	0.0		6.6	0.0	14.8		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.3	0.1		0.2	0.0	2.5		0.3			
Delay (s)		5.5	0.1		6.8	0.0	17.3		0.3			
Level of Service		A	A		A	A	B		A			
Approach Delay (s)		3.5			6.6			9.1			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			7.1				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			47.3				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			47.1%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd
























South Sutter
 Cumulative Conditions - PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	20	10	10	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	10	10	10	21	10	10	10	10	10
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	108	98	15	108	98	15	21			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108	98	15	108	98	15	21			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	841	777	1064	841	777	1064	1595			1595		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	31	31	41	31								
Volume Left	10	10	21	10								
Volume Right	10	10	10	10								
cSH	878	878	1595	1595								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	0								
Control Delay (s)	9.2	9.2	3.7	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	3.7	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			13.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

South Sutter
Cumulative Conditions - PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	20	10	70	10	2520	320	70	1510	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	21	10	72	10	2598	330	72	1557	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		1			1							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3026	4320	778	3546	4320	1299	1557				2598	
vC1, stage 1 conf vol	1701	1701		2619	2619							
vC2, stage 2 conf vol	1325	2619		928	1701							
vCu, unblocked vol	3026	4320	778	3546	4320	1299	1557				2598	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	0	0	97	0	61	53	98				56	
cM capacity (veh/h)	1	1	339	18	27	152	421				164	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	21	10	21	10	72	10	1299	1299	330	72	778	778
Volume Left	10	0	21	0	0	10	0	0	0	72	0	0
Volume Right	0	10	0	0	72	0	0	0	330	0	0	0
cSH	1	339	18	27	152	421	1700	1700	1700	164	1700	1700
Volume to Capacity	18.57	0.03	1.13	0.39	0.47	0.02	0.76	0.76	0.19	0.44	0.46	0.46
Queue Length 95th (ft)	Err	2	73	30	55	2	0	0	0	50	0	0
Control Delay (s)	Err	16.0	548.5	208.8	48.4	13.8	0.0	0.0	0.0	43.2	0.0	0.0
Lane LOS	F	C	F	F	E	B				E		
Approach Delay (s)	6671.3		164.5		0.0						1.9	
Approach LOS	F		F									
Intersection Summary												
Average Delay		48.1										
Intersection Capacity Utilization		87.3%			ICU Level of Service					E		
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
 3: Sankey Rd & Road "H"

South Sutter
 Cumulative Conditions - PM Peak



















Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	390	20	10	40	50	70
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	402	21	10	41	52	72
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			423		474	412
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			423		474	412
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		91	89
cM capacity (veh/h)			1137		544	640

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	423	52	124
Volume Left	0	10	52
Volume Right	21	0	72
cSH	1700	1137	596
Volume to Capacity	0.25	0.01	0.21
Queue Length 95th (ft)	0	1	19
Control Delay (s)	0.0	1.7	12.6
Lane LOS		A	B
Approach Delay (s)	0.0	1.7	12.6
Approach LOS			B

Intersection Summary			
Average Delay		2.8	
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)		15	






















HCM Unsignalized Intersection Capacity Analysis
 4: Riego Rd & Power Line Rd

South Sutter
 Cumulative Conditions - PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	10	10	20	20	10	10	20	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	21	10	10	21	21	10	10	21	10	10	10
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	41	52	41	31								
Volume Left (vph)	10	10	10	10								
Volume Right (vph)	10	21	21	10								
Hadj (s)	-0.07	-0.17	-0.22	-0.10								
Departure Headway (s)	4.0	3.9	3.9	4.0								
Degree Utilization, x	0.05	0.06	0.04	0.03								
Capacity (veh/h)	869	895	888	867								
Control Delay (s)	7.2	7.2	7.1	7.2								
Approach Delay (s)	7.2	7.2	7.1	7.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				7.2								
HCM Level of Service				A								
Intersection Capacity Utilization				13.5%	ICU Level of Service							A
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

South Sutter
Cumulative Conditions - PM Peak

												
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		0.95	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1713		1681	1669		1770	2888	1583	1770	3343	1583
Flt Permitted		0.99		0.95	0.96		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1713		1681	1669		1770	2888	1583	1770	3343	1583
Volume (vph)	10	10	20	750	10	40	30	2800	1090	60	1470	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	21	773	10	41	31	2887	1124	62	1515	10
RTOR Reduction (vph)	0	20	0	0	2	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	21	0	427	395	0	31	2887	1124	62	1515	10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Split		Prot		Free		Prot		Free	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									Free			Free
Actuated Green, G (s)		6.3		27.0	27.0		3.5	88.8	142.1	4.0	89.3	142.1
Effective Green, g (s)		6.3		27.0	27.0		3.5	88.8	142.1	4.0	89.3	142.1
Actuated g/C Ratio		0.04		0.19	0.19		0.02	0.62	1.00	0.03	0.63	1.00
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		76		319	317		44	1805	1583	50	2101	1583
v/s Ratio Prot		0.01		c0.25	0.24		0.02	c1.00		0.04	0.45	
v/s Ratio Perm									c0.71			0.01
v/c Ratio		0.28		1.34	1.24		0.70	1.60	0.71	1.24	0.72	0.01
Uniform Delay, d1		65.7		57.5	57.5		68.8	26.6	0.0	69.0	17.9	0.0
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.0		172.1	133.9		40.4	272.4	2.7	205.7	1.2	0.0
Delay (s)		67.7		229.7	191.4		109.2	299.0	2.7	274.7	19.2	0.0
Level of Service		E		F	F		F	F	A	F	B	A
Approach Delay (s)		67.7			211.2			215.2			29.0	
Approach LOS		E			F			F			C	
Intersection Summary												
HCM Average Control Delay			168.3			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.43									
Actuated Cycle Length (s)			142.1			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			113.0%			ICU Level of Service			H			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

South Sutter
Cumulative Conditions - PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	20	1130	780	10	30	70
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	1165	804	10	31	72
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	814				2015	809
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	814				2015	809
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				51	81
cM capacity (veh/h)	813				63	380
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	1186	814	103			
Volume Left	21	0	31			
Volume Right	0	10	72			
cSH	813	1700	151			
Volume to Capacity	0.03	0.48	0.68			
Queue Length 95th (ft)	2	0	98			
Control Delay (s)	0.9	0.0	68.9			
Lane LOS	A		F			
Approach Delay (s)	0.9	0.0	68.9			
Approach LOS			F			
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization		88.1%		ICU Level of Service		E
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 7: Riego Rd & Natomas Rd

South Sutter
 Cumulative Conditions - PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	1150	10	20	780	10	10	20	30	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1186	10	21	804	10	10	21	31	10	10	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	1206	835	62	31
Volume Left (vph)	10	21	10	10
Volume Right (vph)	10	10	31	10
Hadj (s)	0.03	0.03	-0.23	-0.10
Departure Headway (s)	5.1	5.1	6.9	7.2
Degree Utilization, x	1.72	1.19	0.12	0.06
Capacity (veh/h)	693	708	510	482
Control Delay (s)	344.1	119.0	10.8	10.7
Approach Delay (s)	344.1	119.0	10.8	10.7
Approach LOS	F	F	B	B

Intersection Summary			
Delay		241.5	
HCM Level of Service		F	
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

South Sutter
 Cumulative Conditions - PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↗	
Sign Control		Stop	Stop		Stop	
Volume (vph)	10	1180	800	210	130	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1216	825	216	134	10
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	1227	825	216	144		
Volume Left (vph)	10	0	0	134		
Volume Right (vph)	0	0	216	10		
Hadj (s)	0.04	0.03	-0.67	0.18		
Departure Headway (s)	5.5	5.8	5.1	7.1		
Degree Utilization, x	1.87	1.32	0.31	0.29		
Capacity (veh/h)	664	636	702	498		
Control Delay (s)	410.4	173.3	9.1	13.0		
Approach Delay (s)	410.4	139.2		13.0		
Approach LOS	F	F		B		
Intersection Summary						
Delay			269.6			
HCM Level of Service			F			
Intersection Capacity Utilization			84.5%		ICU Level of Service	E
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

South Sutter
 Cumulative Conditions - PM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	↘
Sign Control	Stop			Stop	Stop	
Volume (vph)	1260	50	40	900	110	60
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	1299	52	41	928	113	62
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	1299	52	969	175		
Volume Left (vph)	0	0	41	113		
Volume Right (vph)	0	52	0	62		
Hadj (s)	0.03	-0.67	0.04	-0.05		
Departure Headway (s)	5.9	5.2	5.6	6.9		
Degree Utilization, x	2.13	0.07	1.51	0.34		
Capacity (veh/h)	615	682	648	515		
Control Delay (s)	527.3	7.4	253.4	13.4		
Approach Delay (s)	507.5		253.4	13.4		
Approach LOS	F		F	B		
Intersection Summary						
Delay			374.1			
HCM Level of Service			F			
Intersection Capacity Utilization			96.3%	ICU Level of Service	F	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

South Sutter
 Cumulative Conditions - PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	1290	20	50	910	30	20	10	190	60	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1330	21	52	938	31	21	10	196	62	10	10
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	1361	1021	227	82								
Volume Left (vph)	10	52	21	62								
Volume Right (vph)	21	31	196	10								
Hadj (s)	0.03	0.03	-0.47	0.11								
Departure Headway (s)	6.2	6.2	7.0	8.2								
Degree Utilization, x	2.34	1.75	0.44	0.19								
Capacity (veh/h)	586	588	504	415								
Control Delay (s)	621.8	361.9	15.4	13.1								
Approach Delay (s)	621.8	361.9	15.4	13.1								
Approach LOS	F	F	C	B								
Intersection Summary												
Delay			453.4									
HCM Level of Service			F									
Intersection Capacity Utilization			111.2%	ICU Level of Service	H							
Analysis Period (min)			15									


































HCM Signalized Intersection Capacity Analysis
11: Baseline Rd & Brewer Rd

South Sutter
Cumulative Conditions - PM Peak

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	0.91	1.00	1.00	0.91	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	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	1380	10	290	920	70	20	60	240	40	50	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	1423	10	299	948	72	21	62	247	41	52	10
RTOR Reduction (vph)	0	0	6	0	0	32	0	0	205	0	0	8
Lane Group Flow (vph)	10	1423	4	299	948	40	21	62	42	41	52	2
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	0.6	28.9	28.9	15.2	43.5	43.5	1.5	13.3	13.3	4.1	15.9	15.9
Effective Green, g (s)	0.6	28.9	28.9	15.2	43.5	43.5	1.5	13.3	13.3	4.1	15.9	15.9
Actuated g/C Ratio	0.01	0.37	0.37	0.20	0.56	0.56	0.02	0.17	0.17	0.05	0.21	0.21
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)	14	1896	590	347	2854	889	34	320	272	94	382	325
v/s Ratio Prot	0.01	c0.28		c0.17	0.19		0.01	c0.03		c0.02	c0.03	
v/s Ratio Perm			0.00			0.03			0.03			0.00
v/c Ratio	0.71	0.75	0.01	0.86	0.33	0.05	0.62	0.19	0.16	0.44	0.14	0.01
Uniform Delay, d1	38.4	21.2	15.3	30.1	9.2	7.7	37.7	27.5	27.3	35.6	25.2	24.5
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	100.1	1.7	0.0	19.2	0.3	0.1	29.0	0.3	0.3	14.0	0.2	0.0
Delay (s)	138.5	22.9	15.3	49.3	9.5	7.7	66.7	27.8	27.6	49.6	25.3	24.5
Level of Service	F	C	B	D	A	A	E	C	C	D	C	C
Approach Delay (s)		23.6			18.4			30.1			34.9	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM Average Control Delay			22.5				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			77.5				Sum of lost time (s)		20.0			
Intersection Capacity Utilization			61.6%				ICU Level of Service		B			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

South Sutter
Cumulative Conditions - PM Peak


































												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	1070	1640	140	740	1450	20	160	930	690	20	1010	930
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1103	1691	144	763	1495	21	165	959	711	21	1041	959
RTOR Reduction (vph)	0	0	45	0	0	11	0	0	306	0	0	351
Lane Group Flow (vph)	1103	1691	99	763	1495	10	165	959	405	21	1041	608
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	37.0	44.0	44.0	28.4	35.0	35.0	5.0	43.9	43.9	2.4	41.3	41.3
Effective Green, g (s)	37.0	46.0	46.0	28.0	37.0	37.0	5.0	44.2	44.2	2.4	41.6	41.6
Actuated g/C Ratio	0.27	0.34	0.34	0.20	0.27	0.27	0.04	0.32	0.32	0.02	0.30	0.30
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.3
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	930	1712	533	704	1377	429	126	1645	512	60	1549	482
v/s Ratio Prot	c0.32	0.33		0.22	c0.29		c0.05	0.19		0.01	0.20	
v/s Ratio Perm			0.06			0.01			c0.26			c0.38
v/c Ratio	1.19	0.99	0.19	1.08	1.09	0.02	1.31	0.58	0.79	0.35	0.67	1.26
Uniform Delay, d1	49.8	45.0	32.0	54.3	49.8	36.5	65.8	38.5	42.0	66.3	41.5	47.5
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	94.6	18.6	0.1	58.9	51.1	0.0	184.8	0.3	7.6	3.5	0.9	133.9
Delay (s)	144.4	63.7	32.1	113.2	100.9	36.6	250.6	38.9	49.6	69.8	42.4	181.4
Level of Service	F	E	C	F	F	D	F	D	D	E	D	F
Approach Delay (s)		92.4			104.4			62.1			108.7	
Approach LOS		F			F			E			F	

Intersection Summary

HCM Average Control Delay	92.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	136.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

















HCM Signalized Intersection Capacity Analysis
13: Baseline Rd & Fiddymnt Rd

South Sutter
Cumulative Conditions - PM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	730	1250	70	250	1020	470	30	990	280	400	1150	600
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	753	1289	72	258	1052	485	31	1021	289	412	1186	619
RTOR Reduction (vph)	0	0	46	0	0	104	0	0	168	0	0	280
Lane Group Flow (vph)	753	1289	26	258	1052	381	31	1021	121	412	1186	339
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	27.0	44.0	44.0	13.0	30.0	30.0	1.8	37.6	37.6	12.0	47.8	47.8
Effective Green, g (s)	27.0	46.0	46.0	13.0	32.0	32.0	1.8	39.6	39.6	12.0	49.8	49.8
Actuated g/C Ratio	0.21	0.36	0.36	0.10	0.25	0.25	0.01	0.31	0.31	0.09	0.39	0.39
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	732	1848	575	353	1285	400	49	1107	495	325	1392	623
v/s Ratio Prot	c0.22	0.25		0.08	0.21		0.01	c0.29		c0.12	0.34	
v/s Ratio Perm			0.02			c0.24			0.08			0.21
v/c Ratio	1.03	0.70	0.05	0.73	0.82	0.95	0.63	0.92	0.24	1.27	0.85	0.54
Uniform Delay, d1	49.8	34.4	26.1	55.1	44.6	46.6	62.1	42.0	32.4	57.3	35.0	29.6
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	40.8	1.4	0.1	6.6	4.7	33.4	17.9	12.9	0.5	142.6	5.7	1.6
Delay (s)	90.6	35.8	26.2	61.7	49.3	80.0	80.0	54.9	32.9	199.9	40.7	31.3
Level of Service	F	D	C	E	D	E	E	D	C	F	D	C
Approach Delay (s)		55.0			59.3			50.7			67.7	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM Average Control Delay			59.0	HCM Level of Service				E				
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			126.6	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			92.6%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

South Sutter
 Cumulative Conditions - PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	50	4	15	10	5	6	2	3	5	10	5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	52	4	15	10	5	6	2	3	5	10	5
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	66	31	11	21								
Volume Left (vph)	10	15	6	5								
Volume Right (vph)	4	5	3	5								
Hadj (s)	0.03	0.03	-0.02	-0.07								
Departure Headway (s)	4.0	4.1	4.1	4.1								
Degree Utilization, x	0.07	0.03	0.01	0.02								
Capacity (veh/h)	880	871	845	863								
Control Delay (s)	7.3	7.2	7.2	7.1								
Approach Delay (s)	7.3	7.2	7.2	7.1								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.3									
HCM Level of Service			A									
Intersection Capacity Utilization			14.2%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

South Sutter
 Cumulative Conditions - PM Peak

												
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	1070	10	0	490	40	0	0	590	0	0	40
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	1103	10	0	505	41	0	0	608	0	0	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.79						0.79	0.79		0.79	0.79	0.79
vC, conflicting volume	546			1113			1675	1655	1108	2242	1639	526
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	428			1113			1851	1825	1108	2566	1806	402
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			100			100	100	0	0	100	92
cM capacity (veh/h)	897			627			42	61	255	0	63	514
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1113	546	608	41								
Volume Left	0	0	0	0								
Volume Right	10	41	608	41								
cSH	1700	1700	255	514								
Volume to Capacity	0.65	0.32	2.38	0.08								
Queue Length 95th (ft)	0	0	1220	7								
Control Delay (s)	0.0	0.0	665.0	12.6								
Lane LOS			F	B								
Approach Delay (s)	0.0	0.0	665.0	12.6								
Approach LOS			F	B								
Intersection Summary												
Average Delay			175.4									
Intersection Capacity Utilization			100.1%		ICU Level of Service				G			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

South Sutter
 Cumulative Conditions - PM Peak



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	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	1863	1583	1723	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	1863	1583	1723	
Volume (vph)	130	1530	520	50	20	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	1577	536	52	21	10
RTOR Reduction (vph)	0	0	0	30	8	0
Lane Group Flow (vph)	134	1577	536	22	23	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		4	
Permitted Phases				6		
Actuated Green, G (s)	5.3	28.0	18.7	18.7	7.9	
Effective Green, g (s)	5.3	28.0	18.7	18.7	7.9	
Actuated g/C Ratio	0.12	0.64	0.43	0.43	0.18	
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)	214	2257	794	674	310	
v/s Ratio Prot	0.08	c0.45	0.29		c0.01	
v/s Ratio Perm				0.01		
v/c Ratio	0.63	0.70	0.68	0.03	0.07	
Uniform Delay, d1	18.4	5.2	10.2	7.3	15.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.6	1.0	2.3	0.0	0.1	
Delay (s)	24.0	6.2	12.4	7.4	15.1	
Level of Service	C	A	B	A	B	
Approach Delay (s)		7.6	12.0		15.1	
Approach LOS		A	B		B	

Intersection Summary

HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

South Sutter
 Cumulative Conditions - PM Peak



































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	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)	470	1350	860	220	230	380
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	485	1392	887	227	237	392
RTOR Reduction (vph)	0	0	0	164	0	279
Lane Group Flow (vph)	485	1392	887	63	237	113
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	22.9	48.9	22.0	22.0	23.0	23.0
Effective Green, g (s)	22.9	48.9	22.0	22.0	23.0	23.0
Actuated g/C Ratio	0.29	0.61	0.28	0.28	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)	507	2166	974	436	510	456
v/s Ratio Prot	c0.27	0.39	c0.25		c0.13	
v/s Ratio Perm				0.04		0.07
v/c Ratio	0.96	0.64	0.91	0.14	0.46	0.25
Uniform Delay, d1	28.0	9.9	28.0	21.8	23.4	21.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.0	0.7	14.0	0.7	3.0	1.3
Delay (s)	57.0	10.6	42.0	22.5	26.4	23.1
Level of Service	E	B	D	C	C	C
Approach Delay (s)		22.6	38.0		24.4	
Approach LOS		C	D		C	

Intersection Summary

HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	79.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

































HCM Signalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

South Sutter
 Cumulative Conditions - PM Peak

												
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	200	1230	190	120	820	190	220	340	200	210	270	200
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	206	1268	196	124	845	196	227	351	206	216	278	206
RTOR Reduction (vph)	0	0	120	0	0	127	0	0	90	0	0	106
Lane Group Flow (vph)	206	1268	76	124	845	69	227	351	116	216	278	100
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2			1	6			7	4		
Permitted Phases			2				6				4	
Actuated Green, G (s)	7.0	31.0	31.0	4.0	28.0	28.0	6.0	23.0	23.0	6.0	23.0	23.0
Effective Green, g (s)	7.0	31.0	31.0	4.0	28.0	28.0	6.0	23.0	23.0	6.0	23.0	23.0
Actuated g/C Ratio	0.09	0.39	0.39	0.05	0.35	0.35	0.08	0.29	0.29	0.08	0.29	0.29
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)	300	1371	613	172	1239	554	257	1017	455	257	1017	455
v/s Ratio Prot	c0.06	c0.36			0.04	0.24			c0.07	c0.10		
v/s Ratio Perm			0.05				0.04				0.06	
v/c Ratio	0.69	0.92	0.12	0.72	0.68	0.12	0.88	0.35	0.25	0.84	0.27	0.22
Uniform Delay, d1	35.4	23.4	15.8	37.4	22.2	17.7	36.7	22.5	21.9	36.5	22.0	21.7
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	6.4	11.9	0.4	13.8	3.1	0.5	27.9	0.9	1.3	21.2	0.7	1.1
Delay (s)	41.8	35.3	16.2	51.3	25.2	18.1	64.6	23.5	23.2	57.7	22.7	22.8
Level of Service	D	D	B	D	C	B	E	C	C	E	C	C
Approach Delay (s)	33.9				26.8				35.3		33.5	
Approach LOS	C				C				D		C	
Intersection Summary												
HCM Average Control Delay			32.2		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)				16.0			
Intersection Capacity Utilization			66.1%		ICU Level of Service				C			
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

South Sutter
Cumulative Conditions - PM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	800	790	590	280	380	230	690	1250	380	330	1160	740
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	825	814	608	289	392	237	711	1289	392	340	1196	763
RTOR Reduction (vph)	0	0	217	0	0	179	0	0	160	0	0	300
Lane Group Flow (vph)	825	814	391	289	392	58	711	1289	232	340	1196	463
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	30.6	45.1	45.1	13.1	27.9	27.9	25.6	44.9	44.9	15.1	34.4	34.4
Effective Green, g (s)	32.1	46.8	46.8	14.6	29.3	29.3	27.1	46.6	46.6	16.6	36.1	36.1
Actuated g/C Ratio	0.23	0.33	0.33	0.10	0.21	0.21	0.19	0.33	0.33	0.12	0.26	0.26
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	784	1693	527	356	1060	330	662	1685	525	405	1306	406
v/s Ratio Prot	c0.24	0.16		0.08	0.08		c0.21	0.25		0.10	0.24	
v/s Ratio Perm			c0.25			0.04			0.15			c0.29
v/c Ratio	1.05	0.48	0.74	0.81	0.37	0.18	1.07	0.76	0.44	0.84	0.92	1.14
Uniform Delay, d1	54.2	37.3	41.5	61.7	47.7	45.7	56.8	42.1	36.8	60.7	50.8	52.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	46.8	0.6	7.3	12.5	0.5	0.5	56.5	2.6	1.4	13.6	10.8	88.6
Delay (s)	101.0	37.8	48.9	74.2	48.2	46.3	113.3	44.7	38.2	74.3	61.6	140.8
Level of Service	F	D	D	E	D	D	F	D	D	E	E	F
Approach Delay (s)		64.0			55.9			64.0			89.7	
Approach LOS		E			E			E			F	
Intersection Summary												
HCM Average Control Delay			70.6			HCM Level of Service		E				
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			140.6			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			85.6%			ICU Level of Service		E				
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

South Sutter
 Cumulative Conditions - PM Peak

													
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	
Lane Util. Factor		0.91	1.00		0.95	1.00				0.97		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		5085	1583		3539	1583				3433		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		5085	1583		3539	1583				3433		1583	
Volume (vph)	0	730	60	0	500	360	0	0	0	260	0	160	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	753	62	0	515	371	0	0	0	268	0	165	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	118	
Lane Group Flow (vph)	0	753	62	0	515	371	0	0	0	268	0	47	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4	
Actuated Green, G (s)		24.9	44.2		24.9	44.2				11.3		11.3	
Effective Green, g (s)		24.9	44.2		24.9	44.2				11.3		11.3	
Actuated g/C Ratio		0.56	1.00		0.56	1.00				0.26		0.26	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2865	1583		1994	1583				878		405	
v/s Ratio Prot		0.15			0.15					0.08			
v/s Ratio Perm			0.04			0.23						0.03	
v/c Ratio		0.26	0.04		0.26	0.23				0.31		0.12	
Uniform Delay, d1		4.9	0.0		4.9	0.0				13.3		12.6	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.0		0.3	0.3				0.2		0.1	
Delay (s)		5.0	0.0		5.2	0.3				13.5		12.8	
Level of Service		A	A		A	A				B		B	
Approach Delay (s)		4.6			3.2			0.0			13.2		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			5.8									HCM Level of Service	A
HCM Volume to Capacity ratio			0.23										
Actuated Cycle Length (s)			44.2									Sum of lost time (s)	0.0
Intersection Capacity Utilization			30.4%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
22: Elkhorn Blvd & Hwy 99 NB Ramps

South Sutter
Cumulative Conditions - PM Peak

												
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		0.95	1.00		0.91	1.00	0.97		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3539	1583		5085	1583	3433		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3539	1583		5085	1583	3433		1583			
Volume (vph)	0	750	240	0	690	220	170	0	1400	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	773	247	0	711	227	175	0	1443	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	773	247	0	711	227	175	0	1443	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		29.2	47.0		29.2	47.0	9.8		47.0			
Effective Green, g (s)		29.2	47.0		29.2	47.0	9.8		47.0			
Actuated g/C Ratio		0.62	1.00		0.62	1.00	0.21		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2199	1583		3159	1583	716		1583			
v/s Ratio Prot		0.22			0.14		0.05					
v/s Ratio Perm			0.16			0.14			c0.91			
v/c Ratio		0.35	0.16		0.23	0.14	0.24		0.91			
Uniform Delay, d1		4.3	0.0		3.9	0.0	15.5		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.4	0.2		0.0	0.2	0.2		9.5			
Delay (s)		4.8	0.2		4.0	0.2	15.7		9.5			
Level of Service		A	A		A	A	B		A			
Approach Delay (s)		3.7			3.0			10.1			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay			6.4				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			47.0				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			32.2%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

South Sutter
 Cumulative Conditions - PM Peak

	→	↘	↙	←	↖	↗
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	0.91	1.00	1.00	0.91	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	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	1770	5085	1770	1583
Volume (vph)	1340	90	550	450	80	930
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1381	93	567	464	82	959
RTOR Reduction (vph)	0	66	0	0	0	400
Lane Group Flow (vph)	1381	27	567	464	82	559
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	4	
Permitted Phases		2				4
Actuated Green, G (s)	30.5	30.5	33.5	67.5	33.5	33.5
Effective Green, g (s)	32.0	32.0	33.0	69.0	33.0	33.0
Actuated g/C Ratio	0.29	0.29	0.30	0.63	0.30	0.30
Clearance Time (s)	5.5	5.5	3.5	5.5	3.5	3.5
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	1479	461	531	3190	531	475
v/s Ratio Prot	c0.27		c0.32	0.09	0.05	
v/s Ratio Perm		0.02				c0.35
v/c Ratio	0.93	0.06	1.07	0.15	0.15	1.18
Uniform Delay, d1	38.0	28.1	38.5	8.4	28.3	38.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	0.1	58.4	0.0	0.0	99.4
Delay (s)	49.1	28.2	96.9	8.4	28.3	137.9
Level of Service	D	C	F	A	C	F
Approach Delay (s)	47.7			57.1	129.2	
Approach LOS	D			E	F	

Intersection Summary			
HCM Average Control Delay	74.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

South Sutter
 Cumulative Conditions - PM Peak















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	4.0
Lane Util. Factor	1.00	0.91	0.91	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	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	560	1700	1100	40	20	50
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	577	1753	1134	41	21	52
RTOR Reduction (vph)	0	0	0	28	0	47
Lane Group Flow (vph)	577	1753	1134	13	21	5
Turn Type	Prot		Perm		Perm	
Protected Phases	5	2	6		8	
Permitted Phases				6		8
Actuated Green, G (s)	31.7	57.9	22.2	22.2	6.7	6.7
Effective Green, g (s)	31.7	57.9	22.2	22.2	6.7	6.7
Actuated g/C Ratio	0.44	0.80	0.31	0.31	0.09	0.09
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)	773	4055	1555	484	163	146
v/s Ratio Prot	c0.33	0.34	c0.22		c0.01	
v/s Ratio Perm				0.01		0.00
v/c Ratio	0.75	0.43	0.73	0.03	0.13	0.03
Uniform Delay, d1	17.1	2.3	22.5	17.6	30.3	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	0.1	1.7	0.0	0.4	0.1
Delay (s)	21.0	2.3	24.3	17.7	30.6	30.1
Level of Service	C	A	C	B	C	C
Approach Delay (s)		7.0	24.0		30.2	
Approach LOS		A	C		C	

Intersection Summary

HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			













HCM Signalized Intersection Capacity Analysis
64: Elverta Rd & SB Ramps

South Sutter
Cumulative Conditions - PM Peak

													
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	
Lane Util. Factor		0.95	1.00		1.00	1.00				1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (prot)		3539	1583		1863	1583				1770	1583	1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (perm)		3539	1583		1863	1583				1770	1583	1583	
Volume (vph)	0	490	320	0	170	350	0	0	0	50	0	90	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	505	330	0	175	361	0	0	0	52	0	93	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	78	
Lane Group Flow (vph)	0	505	330	0	175	361	0	0	0	52	0	15	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		40.3	57.6		40.3	57.6				9.3		9.3	
Effective Green, g (s)		40.3	57.6		40.3	57.6				9.3		9.3	
Actuated g/C Ratio		0.70	1.00		0.70	1.00				0.16		0.16	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2476	1583		1303	1583				286		256	
v/s Ratio Prot		0.14			0.09					0.03			
v/s Ratio Perm			0.21			0.23						0.01	
v/c Ratio		0.20	0.21		0.13	0.23				0.18		0.06	
Uniform Delay, d1		3.0	0.0		2.9	0.0				20.9		20.4	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.3		0.2	0.3				0.3		0.1	
Delay (s)		3.1	0.3		3.1	0.3				21.2		20.5	
Level of Service		A	A		A	A				C		C	
Approach Delay (s)		2.0			1.2			0.0			20.8		
Approach LOS		A			A			A			C		
Intersection Summary													
HCM Average Control Delay			3.5									HCM Level of Service	A
HCM Volume to Capacity ratio			0.23										
Actuated Cycle Length (s)			57.6									Sum of lost time (s)	0.0
Intersection Capacity Utilization			23.5%									ICU Level of Service	A
Analysis Period (min)			15										
c	Critical Lane Group												

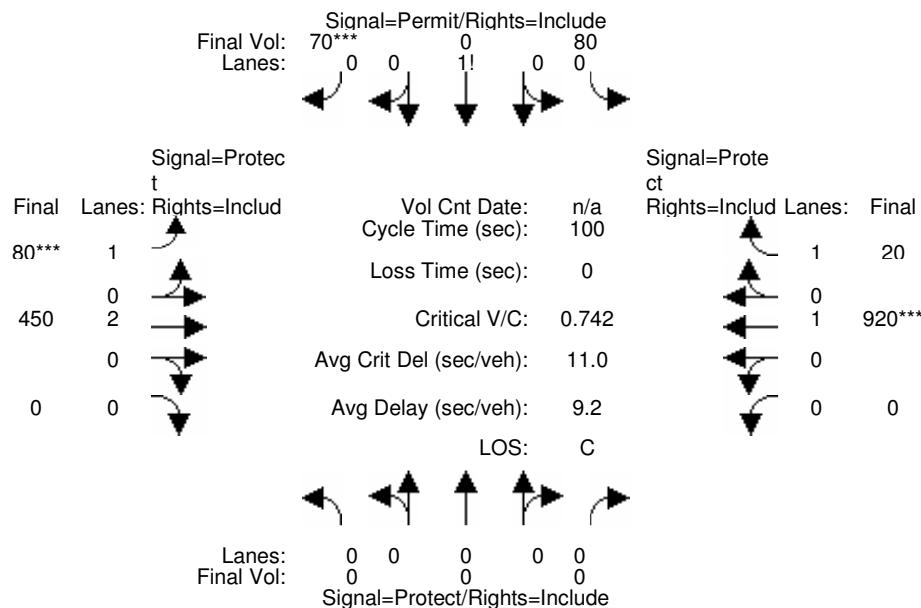
HCM Signalized Intersection Capacity Analysis
65: Elverta Rd & NB Ramps

South Sutter
Cumulative Conditions - PM Peak

												
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	1.00		0.95	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		3539	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		3539	1583	1770		1583			
Volume (vph)	0	280	260	0	500	70	20	0	810	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	289	268	0	515	72	21	0	835	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	289	268	0	515	72	21	0	835	0	0	0
Turn Type		Free			Free		Prot		Free			
Protected Phases		2			6		4					
Permitted Phases		Free			Free				Free			
Actuated Green, G (s)		92.9	106.4		92.9	106.4	5.5		106.4			
Effective Green, g (s)		92.9	106.4		92.9	106.4	5.5		106.4			
Actuated g/C Ratio		0.87	1.00		0.87	1.00	0.05		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1627	1583		3090	1583	91		1583			
v/s Ratio Prot		0.16			0.15		0.01					
v/s Ratio Perm			0.17			0.05			c0.53			
v/c Ratio		0.18	0.17		0.17	0.05	0.23		0.53			
Uniform Delay, d1		1.0	0.0		1.0	0.0	48.4		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.2	0.2		0.0	0.1	1.3		1.3			
Delay (s)		1.3	0.2		1.0	0.1	49.7		1.3			
Level of Service		A	A		A	A	D		A			
Approach Delay (s)		0.8			0.9			2.5			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay		1.5			HCM Level of Service			A				
HCM Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		106.4			Sum of lost time (s)			0.0				
Intersection Capacity Utilization		24.7%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative AM

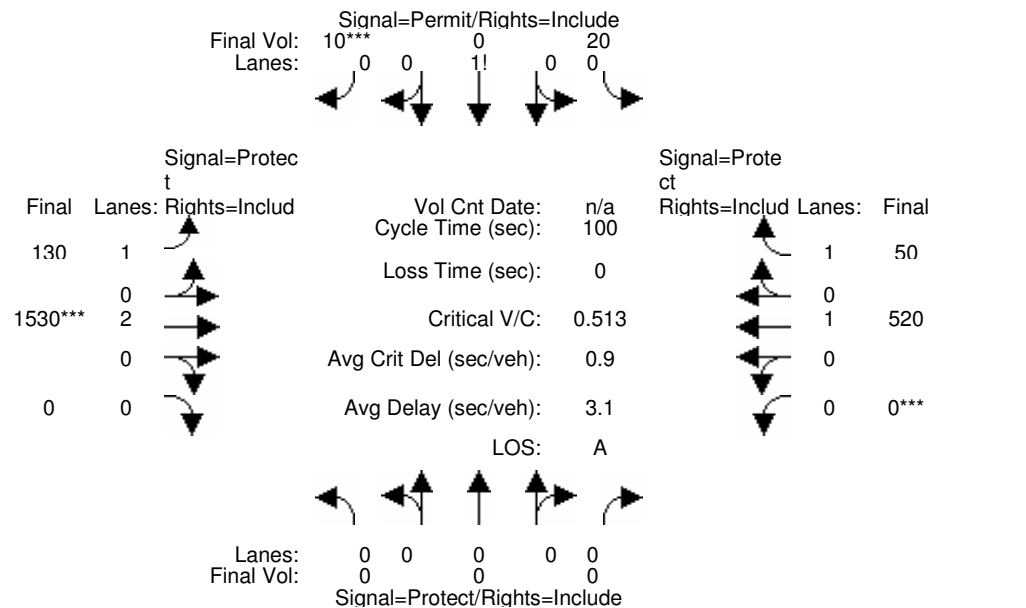
Intersection #17: Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	80	0	70	80	450	0	0	0	920
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	80	0	70	80	450	0	0	0	920
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	80	0	70	80	450	0	0	0	920
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	80	0	70	80	450	0	0	0	920
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	80	0	70	80	450	0	0	0	920
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	80	0	70	80	450	0	0	0	920
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.53	0.00	0.47	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	827	0	723	1550	3100	0	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.10	0.00	0.10	0.05	0.15	0.00	0.00	0.59	0.01
Crit Volume:	0					150	80				920	
Crit Moves:						****	****				****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative PM

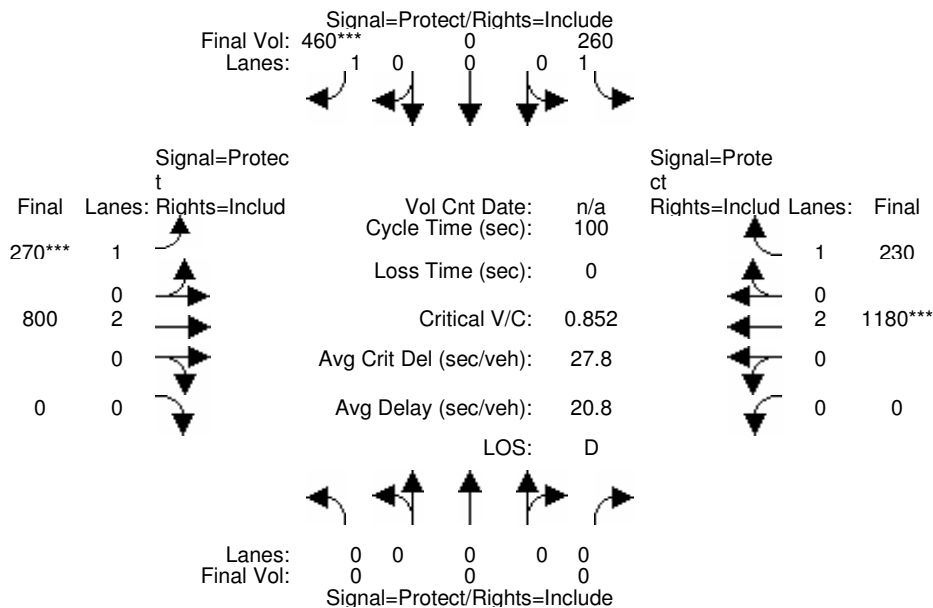
Intersection #17: Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	20	0	10	130	1530	0	0	520	50
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	20	0	10	130	1530	0	0	520	50
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	20	0	10	130	1530	0	0	520	50
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	20	0	10	130	1530	0	0	520	50
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	20	0	10	130	1530	0	0	520	50
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	20	0	10	130	1530	0	0	520	50
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.67	0.00	0.33	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1033	0	517	1550	3100	0	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.02	0.08	0.49	0.00	0.00	0.34	0.03
Crit Volume:	0					30	765		0			
Crit Moves:						****	****		****			

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative AM

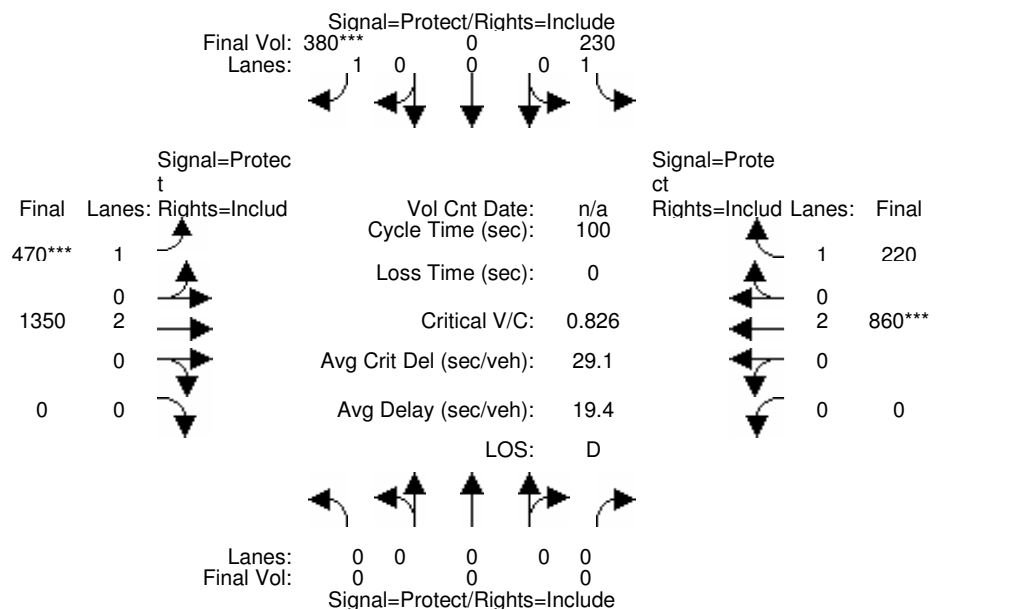
Intersection #18: Elverta Road / Palladay Road



Street Name:	Palladay Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	260	0	460	270	800	0	0	1180	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	260	0	460	270	800	0	0	1180	230
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	260	0	460	270	800	0	0	1180	230
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	260	0	460	270	800	0	0	1180	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	260	0	460	270	800	0	0	1180	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	260	0	460	270	800	0	0	1180	230
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.17	0.00	0.30	0.17	0.26	0.00	0.00	0.38	0.15
Crit Volume:	0					460	270				590	
Crit Moves:						****	****				****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative PM

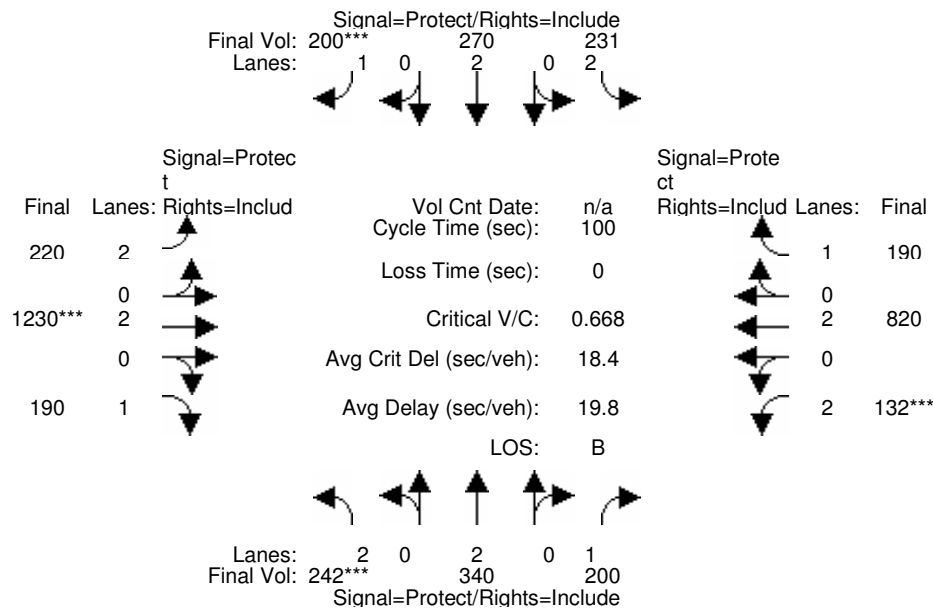
Intersection #18: Elverta Road / Palladay Road



Street Name:	Palladay Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	230	0	380	470	1350	0	0	860	220
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	230	0	380	470	1350	0	0	860	220
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	230	0	380	470	1350	0	0	860	220
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	230	0	380	470	1350	0	0	860	220
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	230	0	380	470	1350	0	0	860	220
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	230	0	380	470	1350	0	0	860	220
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.15	0.00	0.25	0.30	0.44	0.00	0.00	0.28	0.14
Crit Volume:	0					380	470				430	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative PM

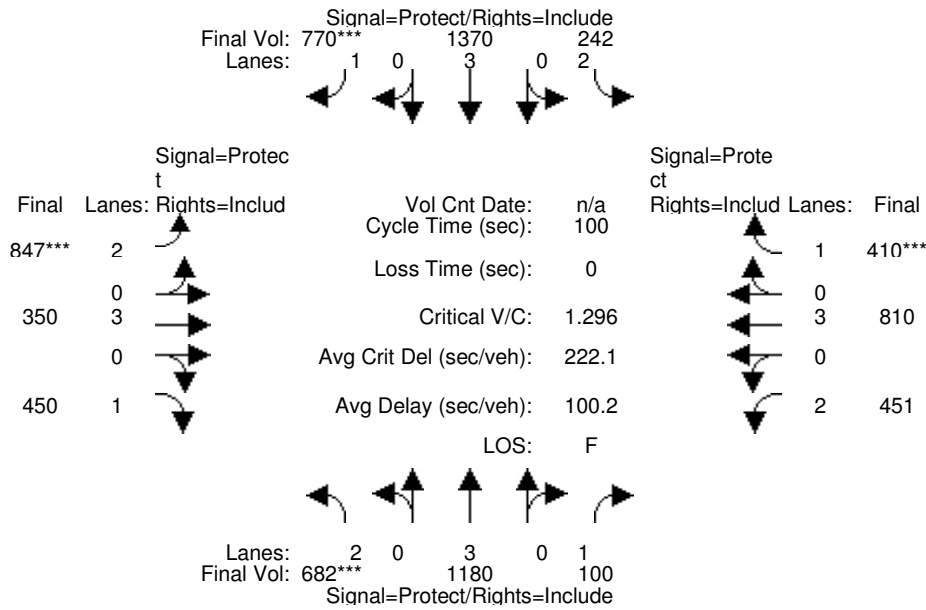
Intersection #19: Elverta Road / 16th Street



Street Name:	16th Street						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	220	340	200	210	270	200	200	1230	190	120	820	190
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	220	340	200	210	270	200	200	1230	190	120	820	190
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	220	340	200	210	270	200	200	1230	190	120	820	190
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	220	340	200	210	270	200	200	1230	190	120	820	190
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	220	340	200	210	270	200	200	1230	190	120	820	190
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	242	340	200	231	270	200	220	1230	190	132	820	190
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	3000	1500	3000	3000	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.08	0.11	0.13	0.08	0.09	0.13	0.07	0.41	0.13	0.04	0.27	0.13
Crit Volume:	121					200	615		66			
Crit Moves:	****					****	****		****			

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative AM

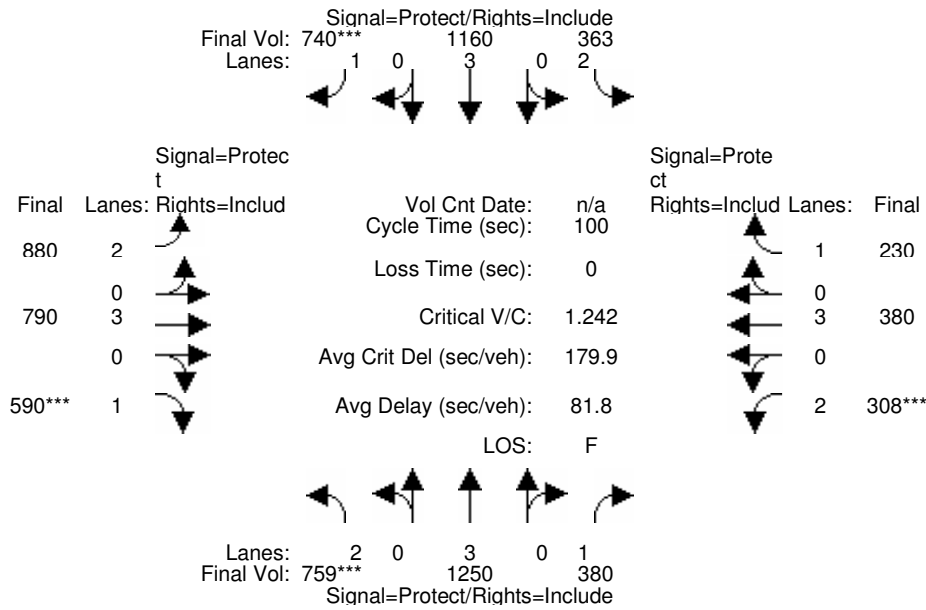
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	620	1180	100	220	1370	770	770	350	450	410	810	410
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	620	1180	100	220	1370	770	770	350	450	410	810	410
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	620	1180	100	220	1370	770	770	350	450	410	810	410
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	620	1180	100	220	1370	770	770	350	450	410	810	410
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	620	1180	100	220	1370	770	770	350	450	410	810	410
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	682	1180	100	242	1370	770	847	350	450	451	810	410
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.23	0.26	0.07	0.08	0.30	0.51	0.28	0.08	0.30	0.15	0.18	0.27
Crit Volume:	341					770	424					410
Crit Moves:	****					****	****					****

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative PM

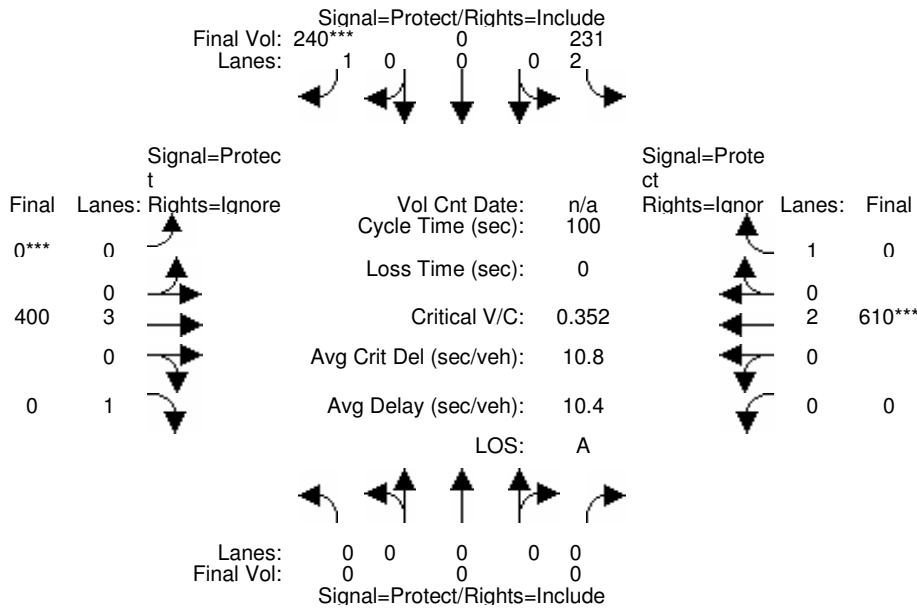
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	690	1250	380	330	1160	740	800	790	590	280	380	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	690	1250	380	330	1160	740	800	790	590	280	380	230
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	690	1250	380	330	1160	740	800	790	590	280	380	230
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	690	1250	380	330	1160	740	800	790	590	280	380	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	690	1250	380	330	1160	740	800	790	590	280	380	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	759	1250	380	363	1160	740	880	790	590	308	380	230
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.25	0.28	0.25	0.12	0.26	0.49	0.29	0.18	0.39	0.10	0.08	0.15
Crit Volume:	380					740			590	154		
Crit Moves:	****					****			****	****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative AM

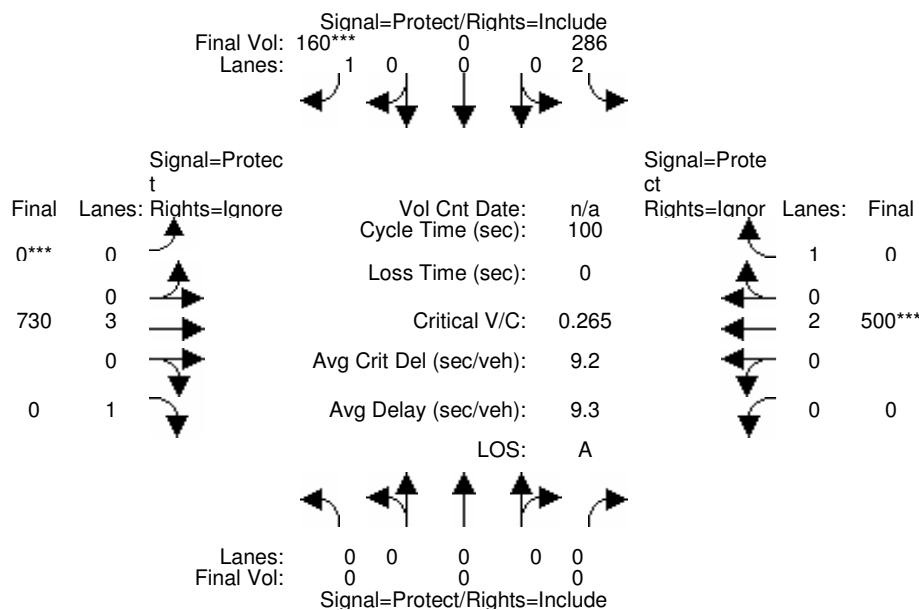
Intersection #21: Elkhorn Boulevard / SR 70 / SR99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	210	0	240	0	400	160	0	610	930
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	210	0	240	0	400	160	0	610	930
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	210	0	240	0	400	160	0	610	930
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	210	0	240	0	400	0	0	610	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	210	0	240	0	400	0	0	610	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	231	0	240	0	400	0	0	610	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	0	3100	0	1550	0	4650	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.07	0.00	0.15	0.00	0.09	0.00	0.00	0.20	0.00
Crit Volume:	0					240	0			305		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative PM

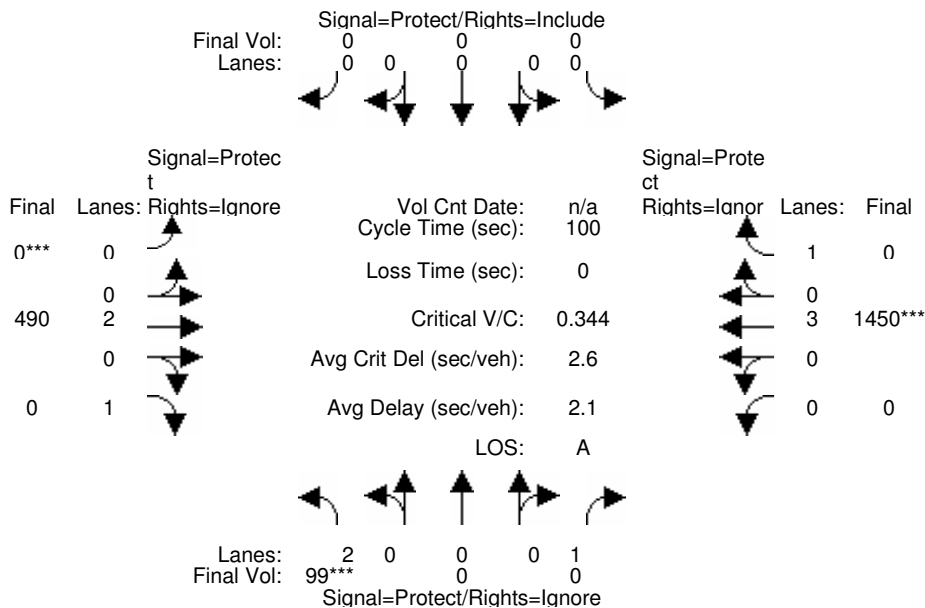
Intersection #21: Elkhorn Boulevard / SR 70 / SR99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	260	0	160	0	730	60	0	500	360
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	260	0	160	0	730	60	0	500	360
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	260	0	160	0	730	60	0	500	360
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	260	0	160	0	730	0	0	500	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	260	0	160	0	730	0	0	500	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	286	0	160	0	730	0	0	500	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	0	3100	0	1550	0	4650	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.09	0.00	0.10	0.00	0.16	0.00	0.00	0.16	0.00
Crit Volume:	0					160	0				250	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative AM

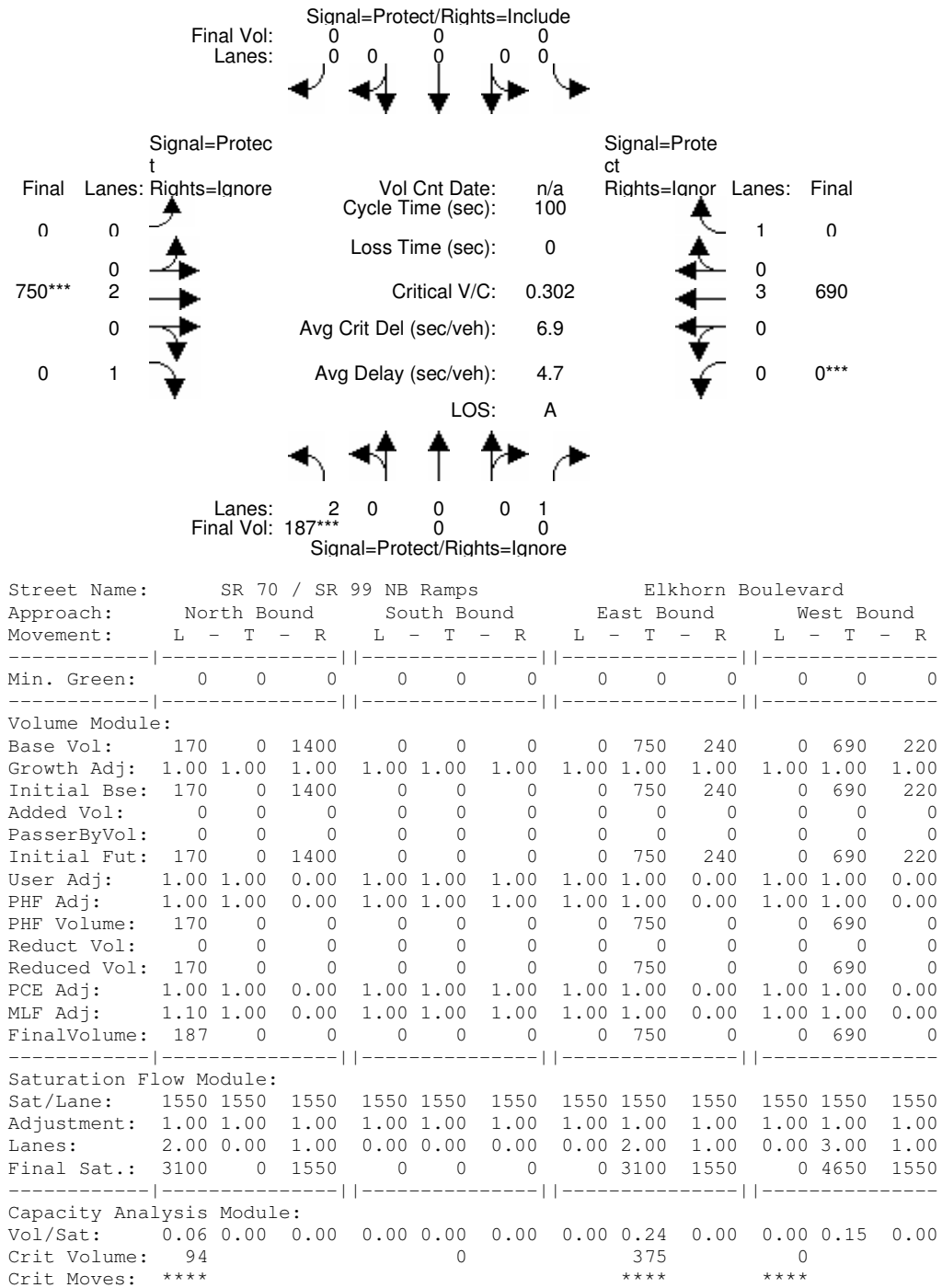
Intersection #22: Elkhorn Boulevard / SR 70 / SR 99 NB Ramps



Street Name:	SR 70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	90	0	480	0	0	0	0	490	120	0	1450	280
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	90	0	480	0	0	0	0	490	120	0	1450	280
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	90	0	480	0	0	0	0	490	120	0	1450	280
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	90	0	0	0	0	0	0	490	0	0	1450	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	90	0	0	0	0	0	0	490	0	0	1450	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.10	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	99	0	0	0	0	0	0	490	0	0	1450	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	3.00	1.00
Final Sat.:	3100	0	1550	0	0	0	0	3100	1550	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.31	0.00
Crit Volume:	50										483	
Crit Moves:	****							****			****	

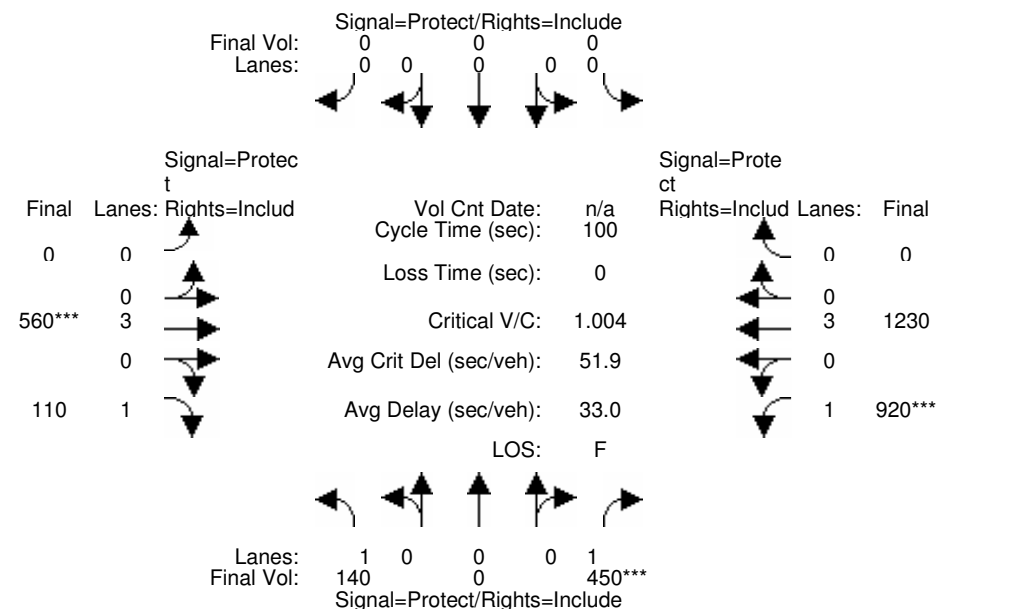
Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative PM

Intersection #22: Elkhorn Boulevard / SR 70 / SR 99 NB Ramps



Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative AM

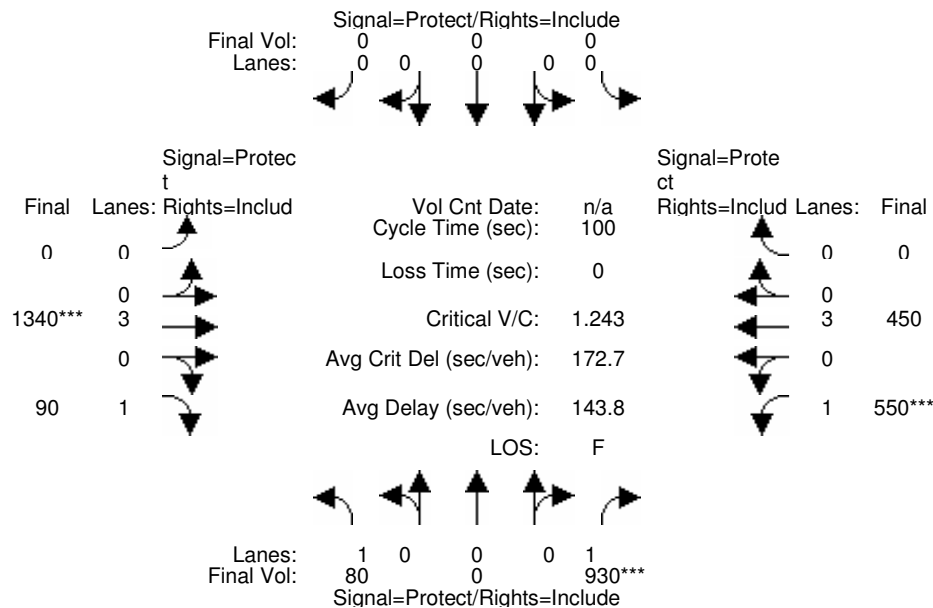
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	140	0	450	0	0	0	0	560	110	920	1230	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	140	0	450	0	0	0	0	560	110	920	1230	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	140	0	450	0	0	0	0	560	110	920	1230	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	140	0	450	0	0	0	0	560	110	920	1230	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	140	0	450	0	0	0	0	560	110	920	1230	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	140	0	450	0	0	0	0	560	110	920	1230	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	1550	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.09	0.00	0.29	0.00	0.00	0.00	0.00	0.12	0.07	0.59	0.26	0.00
Crit Volume:			450	0				187		920		
Crit Moves:			***					****		***		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative PM

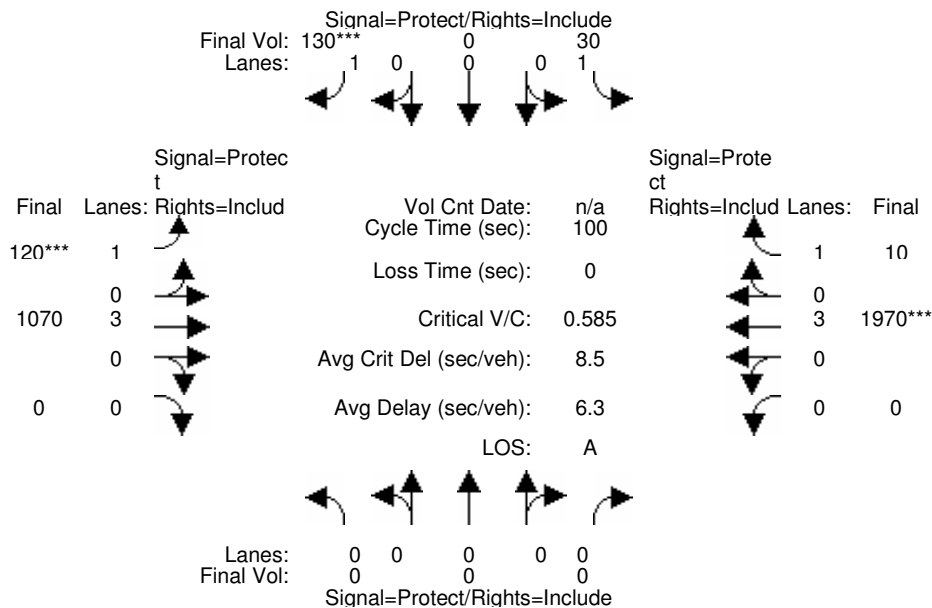
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	80	0	930	0	0	0	0	1340	90	550	450	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	80	0	930	0	0	0	0	1340	90	550	450	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	80	0	930	0	0	0	0	1340	90	550	450	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	80	0	930	0	0	0	0	1340	90	550	450	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	80	0	930	0	0	0	0	1340	90	550	450	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	80	0	930	0	0	0	0	1340	90	550	450	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	1550	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.60	0.00	0.00	0.00	0.00	0.29	0.06	0.35	0.10	0.00
Crit Volume:			930	0				447		550		
Crit Moves:			***					****		***		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative AM

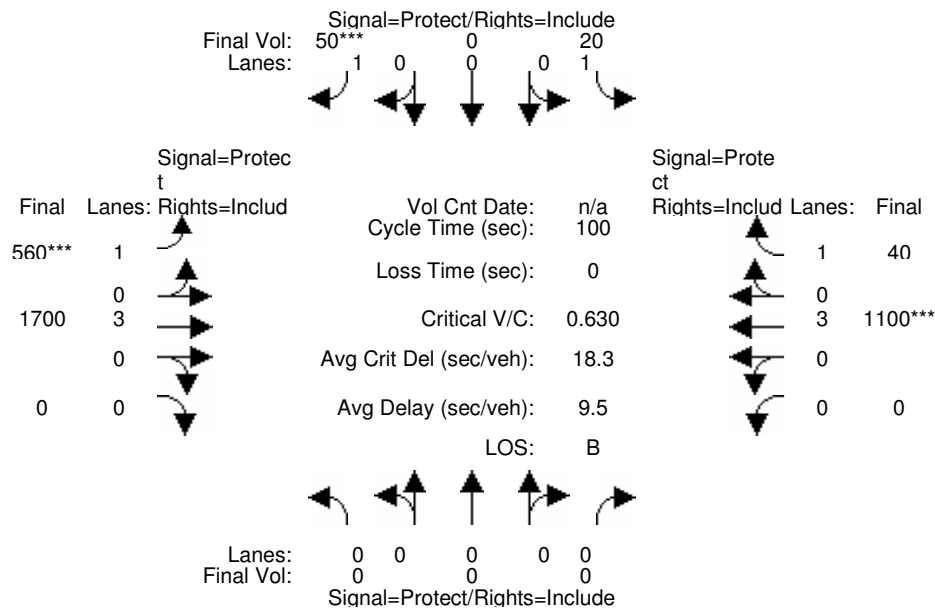
Intersection #24: Elk Horn Boulevard / East Levee Road



Street Name:	East Levee Road						Elk Horn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	30	0	130	120	1070	0	0	1970	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	30	0	130	120	1070	0	0	1970	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	30	0	130	120	1070	0	0	1970	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	30	0	130	120	1070	0	0	1970	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	30	0	130	120	1070	0	0	1970	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	30	0	130	120	1070	0	0	1970	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	4650	0	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.08	0.08	0.23	0.00	0.00	0.42	0.01
Crit Volume:	0					130	120				657	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative PM

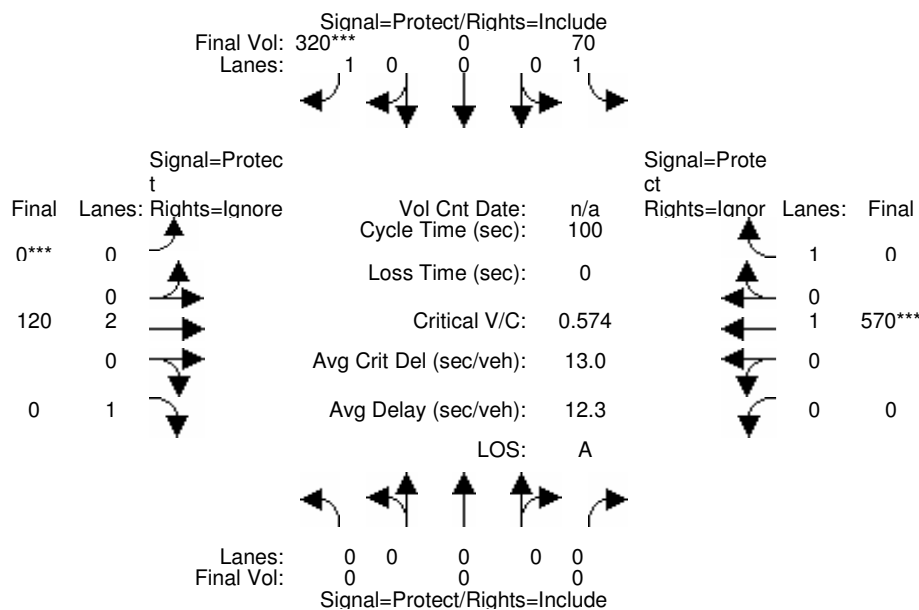
Intersection #24: Elk Horn Boulevard / East Levee Road



Street Name:	East Levee Road						Elk Horn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	20	0	50	560	1700	0	0	1100	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	20	0	50	560	1700	0	0	1100	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	20	0	50	560	1700	0	0	1100	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	20	0	50	560	1700	0	0	1100	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	20	0	50	560	1700	0	0	1100	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	20	0	50	560	1700	0	0	1100	40
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	4650	0	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.01	0.00	0.03	0.36	0.37	0.00	0.00	0.24	0.03
Crit Volume:	0					50	560			367		
Crit Moves:						****	****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative AM

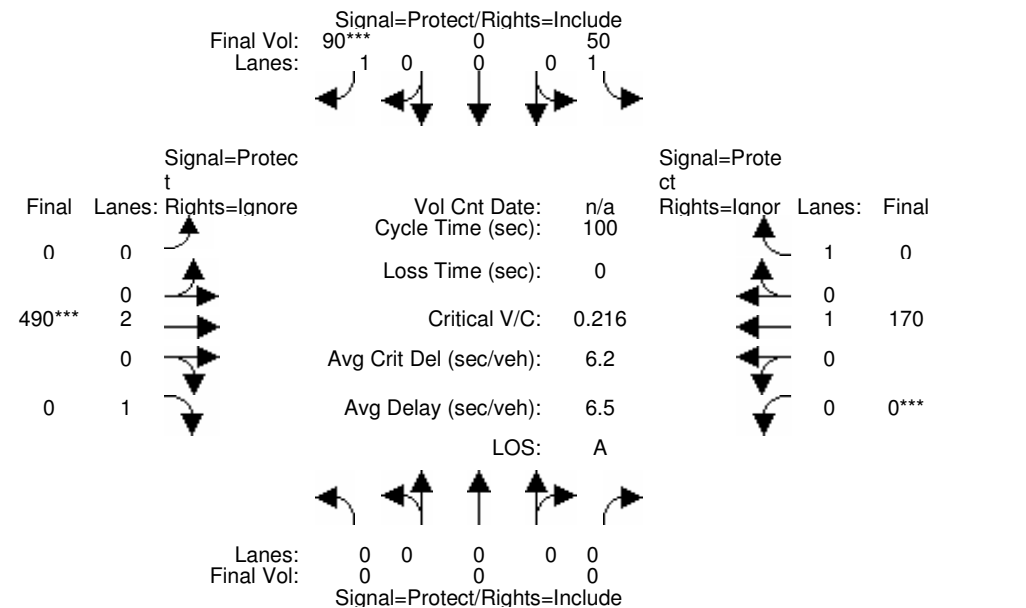
Intersection #64:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	70	0	320	0	120	20	0	570	600
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	70	0	320	0	120	20	0	570	600
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	70	0	320	0	120	20	0	570	600
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	70	0	320	0	120	0	0	570	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	70	0	320	0	120	0	0	570	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	70	0	320	0	120	0	0	570	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	3100	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.05	0.00	0.21	0.00	0.04	0.00	0.00	0.37	0.00
Crit Volume:	0					320	0				570	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative PM

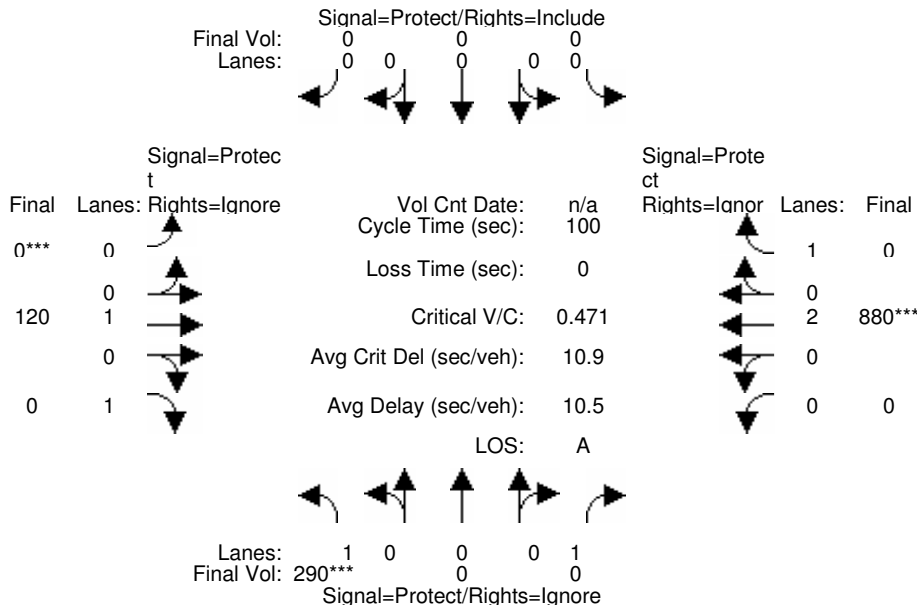
Intersection #64:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	50	0	90	0	490	320	0	170	350
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	50	0	90	0	490	320	0	170	350
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	50	0	90	0	490	320	0	170	350
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	50	0	90	0	490	0	0	170	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	50	0	90	0	490	0	0	170	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	50	0	90	0	490	0	0	170	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	3100	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.16	0.00	0.00	0.11	0.00
Crit Volume:	0					90		245		0		
Crit Moves:						****		****		****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative AM

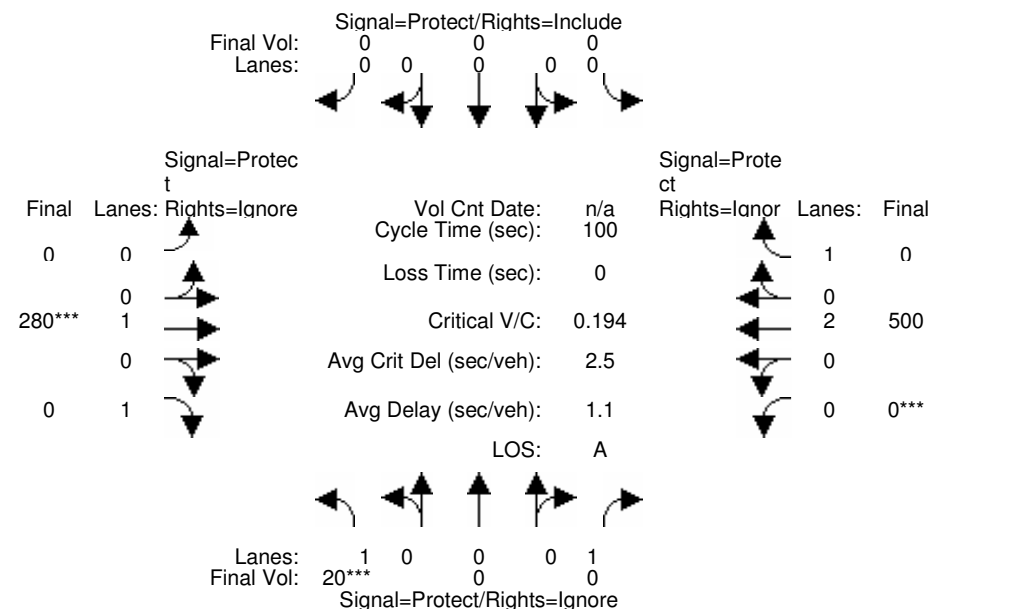
Intersection #65:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	290	0	270	0	0	0	0	120	70	0	880	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	290	0	270	0	0	0	0	120	70	0	880	30
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	290	0	270	0	0	0	0	120	70	0	880	30
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	290	0	0	0	0	0	0	120	0	0	880	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	290	0	0	0	0	0	0	120	0	0	880	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	290	0	0	0	0	0	0	120	0	0	880	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.28	0.00
Crit Volume:	290				0		0			440		
Crit Moves:	****						****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative PM

Intersection #65:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	20	0	810	0	0	0	0	280	260	0	500	70
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	0	810	0	0	0	0	280	260	0	500	70
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	0	810	0	0	0	0	280	260	0	500	70
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	20	0	0	0	0	0	0	280	0	0	500	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	0	0	0	0	0	0	280	0	0	500	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	20	0	0	0	0	0	0	280	0	0	500	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.16	0.00
Crit Volume:	20							280			0	
Crit Moves:	****							****			****	

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 5390 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 280 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5390	280	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1465	76	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6591	312	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 3843$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6903	7050	No
$v v$	2748 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		Yes	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 3891		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	3891	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.564
S
Space mean speed in ramp influence area, S = 52.0 mph
R
Space mean speed in outer lanes, S = 56.1 mph
O
Space mean speed for all vehicles, S = 53.5 mph

Average passenger-car speed, S 53.6 mi/h
 Number of lanes, N 3
 Density, D 43.1 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5670 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1541 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2311 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2311 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 56.1 mi/h
 Number of lanes, N 2
 Density, D 39.8 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3650 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 992 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2232 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2232 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 52.8 mi/h
 Number of lanes, N 2
 Density, D 44.2 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: Airport Blvd to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4130 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1122 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2334 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2334 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 60.5 mi/h
 Number of lanes, N 2
 Density, D 33.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3630 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 986 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2052 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2052 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7420 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1160 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	7420	1160	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	2016	315	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8388	1292	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 4386$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	8388	9400	No
Fi F			
v = v - v	7096	9400	No
FO F R			
v	1292	2100	No
R			
v v	2001 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4386	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 37.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.414$
S
Space mean speed in ramp influence area, $S = 55.5$ mph
R
Space mean speed in outer lanes, $S = 67.4$ mph
0
Space mean speed for all vehicles, $S = 60.6$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2520 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 685 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1541 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1541 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2520 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2520	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	685	155	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3082		635		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3082$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3082	4700	No
Fi F			
$v = v - v$	2447	4700	No
FO F R			
v	635	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3082	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.1$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1950 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 120 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1950	120	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	530	33	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2385	134	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 2385 \text{ pc/h}$
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2519 4700 No
FO
 $v v = 0 \text{ pc/h}$ (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700 \text{ pc/h?}$ No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2385	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.9 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.344
S
Space mean speed in ramp influence area, S = 57.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2070 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 280 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2070	280	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	562	76	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2531	312	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 2531 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2843 4700 No
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2531	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.343
S
Space mean speed in ramp influence area, S = 57.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.1 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 22.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2350 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 639 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1437 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1437 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2350 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 560 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2350	560	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	639	152	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2874	624	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2874$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2874	4700	No
Fi F			
$v = v - v$	2250	4700	No
FO F R			
v	624	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2874	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 26.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.354$
S
Space mean speed in ramp influence area, $S = 56.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1790 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 70 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1790	70	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	486	19	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2189	78	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2189$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2267 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2189	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.0$ - pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.334
S
Space mean speed in ramp influence area, S = 57.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1860 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 30 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1860	30	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	505	8	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2274	33	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2274$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2307 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2274	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.315
S
Space mean speed in ramp influence area, S = 57.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.8 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 17.8 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1890 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 514 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1156 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1156 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.3 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed:
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1310 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 356 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 801 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 801 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.8 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1360 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 370 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 832 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 832 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2690 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 731 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1520 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1520 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.5 mi/h
 Number of lanes, N 2
 Density, D 26.7 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3040 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 826 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1718 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1718 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 55.3 mi/h
 Number of lanes, N 2
 Density, D 40.9 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year:
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4000 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1087 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2261 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2261 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4000 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 390 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4000	390	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1087	106	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4522	435	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4522$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4522	4700	No
Fi F			
$v = v - v$	4087	4700	No
FO F R			
v	435	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4522	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 40.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.337$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3610 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 600 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3610	600	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	981	163	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4081	668	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4081 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4749	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4081	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 39.1 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.746
S
Space mean speed in ramp influence area, S = 47.8 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 47.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4210 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 20 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	4210	20	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1144	5	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4759	22	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4759 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4781 4700 Yes
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4759	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 39.6 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.741
S
Space mean speed in ramp influence area, S = 48.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 48.0 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4230 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 450 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4230	450	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1149	122	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 4782 501 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4782$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4782	4700	Yes
Fi F			
$v = v - v$	4281	4700	No
FO F R			
v	501	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4782	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 27.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.343$
S
Space mean speed in ramp influence area, $S = 57.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3780 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 930 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3780	930	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1027	253	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4273	1036	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4273$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5309	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4273	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 43.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.084
S
Space mean speed in ramp influence area, S = 40.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 40.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4710 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 160 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4710	160	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1280	43	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5324	178	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5324 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5502 4700 Yes
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5324	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 45.2 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.232
S
Space mean speed in ramp influence area, S = 36.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 36.7 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4870 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1080 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4870	1080	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1323	293	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5505	1203	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5505$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5505	4700	Yes
Fi F			
$v = v - v$	4302	4700	No
FO F R			
v	1203	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5505	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 38.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.146$
S
Space mean speed in ramp influence area, $S = 61.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3650 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1080 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3650	1080	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	992	293	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4463	1203	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4463 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5666	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4463	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 39.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.253
S
Space mean speed in ramp influence area, S = 36.2 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 36.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4130 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 500 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4130	500	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1122	136	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4669	557	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4669$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4669	4700	No
Fi F			
$v = v - v$	4112	4700	No
FO F R			
v	557	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4669	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 30.9$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.088$
S
Space mean speed in ramp influence area, $S = 63.0$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 63.0$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2020 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 500 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2020	500	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	549	136	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2470	557	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2470$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3027	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2470	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.206
S
Space mean speed in ramp influence area, S = 60.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 60.3 mph

Leisch Method for Weaving Analysis

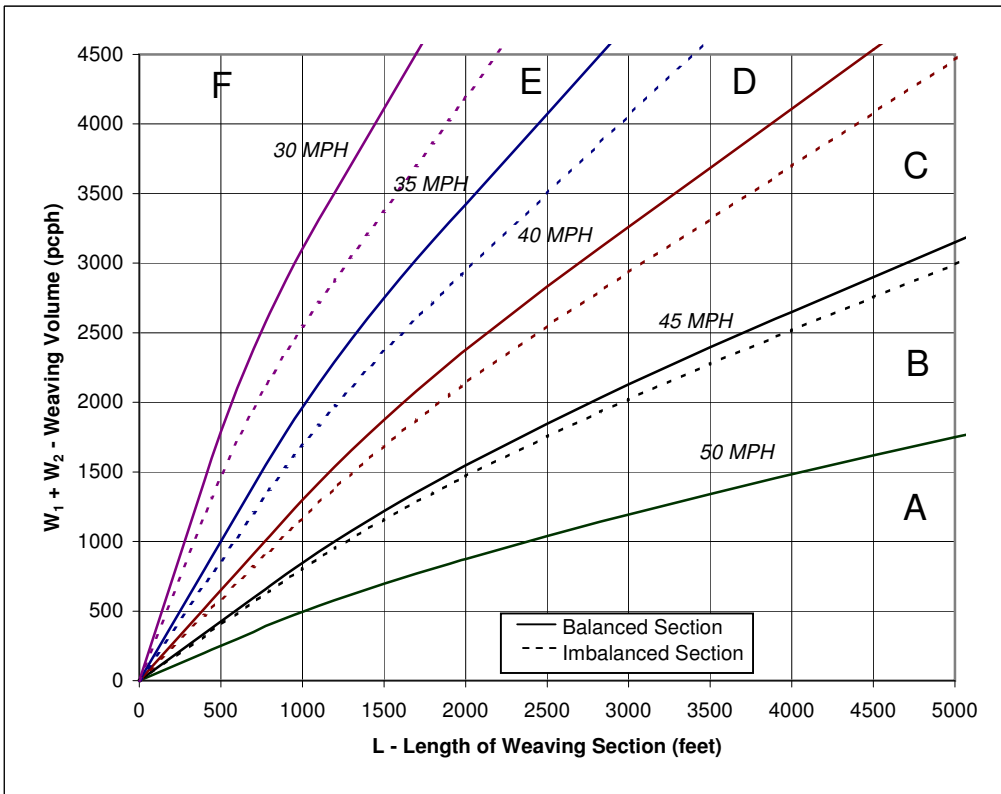
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

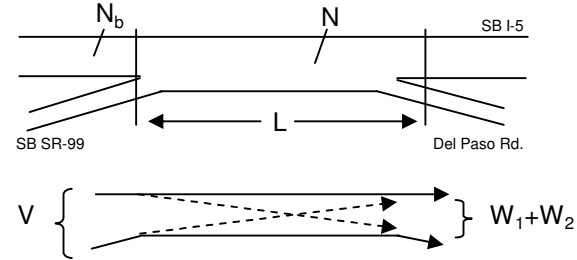
Project Information

Project	South Sutter County
Scenario	Cumulative AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	7,420	3,790	1,160
Truck Percentage	8%	5%	5%
PCE for Trucks	1.5	1.5	1.5
Volume (pcph)	7,717	3,885	1,189



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? N
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and 35 MPH
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) 18.5
- Weaving Intensity Factor (k) 3.00
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ 2,524
- Level of Service (LOS) F

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	5670	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	5670	2020
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.8889
----------	--------

v_i	6933.424	pc/hr/ln
-------	----------	----------

Density, D	25.2	pc/mi/ln
-------------------	------	----------

LOS	C
------------	---

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 7610 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 720 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	7610	720	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1961	186	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8826	761	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 5146$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	9587	7050	Yes
$v v$	3680 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		Yes	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 6126		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	6126	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 57.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 4.123
S
Space mean speed in ramp influence area, S = -29.8 mph
R
Space mean speed in outer lanes, S = 56.1 mph
O
Space mean speed for all vehicles, S = mph

Average passenger-car speed, S 60.5 mi/h
 Number of lanes, N 2
 Density, D 33.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3830 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 987 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2053 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2053 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 59.9 mi/h
 Number of lanes, N 2
 Density, D 34.8 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3810 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 982 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2082 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2082 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 58.2 mi/h
 Number of lanes, N 3
 Density, D 37.0 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Del Paso Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5920 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1526 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2156 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2156 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 5920 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 590 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5920	590	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1526	152	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	6347		623		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 3119$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6347	9400	No
Fi F			
$v = v - v$	5724	9400	No
FO F R			
v	623	2100	No
R			
$v = v$	1614 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3119	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 26.6$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.354$
S
Space mean speed in ramp influence area, $S = 56.9$ mph
R
Space mean speed in outer lanes, $S = 68.9$ mph
0
Space mean speed for all vehicles, $S = 62.4$ mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5530 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1570 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5530	1570	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1425	405	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5929	1659	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5929$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5929	4700	Yes
Fi F			
$v = v - v$	4270	4700	No
FO F R			
v	1659	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5929	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 52.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.447$
S
Space mean speed in ramp influence area, $S = 54.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3960 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 240 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3960	240	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1021	62	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4246	254	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4246 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4500 4700 No
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4246	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.3 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.647
S
Space mean speed in ramp influence area, S = 50.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 50.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4200 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 220 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4200	220	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1082	57	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4503	232	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4503 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4735	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4503	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 39.2 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.720
S
Space mean speed in ramp influence area, S = 48.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 48.4 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4420 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 830 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4420	830	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1139	214	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4739	877	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4739$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4739	4700	Yes
Fi F			
v = v - v	3862	4700	No
FO F R			
v	877	2100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v	4739	4600	No
12			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 42.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.377$
S
Space mean speed in ramp influence area, $S = 56.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.3$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3590 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 260 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3590	260	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	925	67	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3849	275	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3849 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4124 4700 No
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3849	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.537
S
Space mean speed in ramp influence area, S = 52.6 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.6 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3850 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 70 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3850	70	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	992	18	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4128	74	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4128 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4202 4700 No
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4128	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.1 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.537
S
Space mean speed in ramp influence area, S = 52.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.7 mph

Average passenger-car speed, S 59.5 mi/h
 Number of lanes, N 2
 Density, D 35.3 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3920 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1010 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2101 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2101 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.5 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2850 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 735 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1528 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1528 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 21.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2600 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 670 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1394 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1394 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1590 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 410 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 869 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 869 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1540 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 397 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 841 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 841 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 18.8 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2240 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 577 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1224 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1224 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2240 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 140 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2240	140	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	577	36	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	2448		148		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2448$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2448	4700	No
Fi F			
$v = v - v$	2300	4700	No
FO F R			
v	148	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2448	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 22.6$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.311$
S
Space mean speed in ramp influence area, $S = 57.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2100 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 350 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2100	350	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	541	90	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2295	370	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 2295 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2665 4700 No
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2295	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.0 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.352
S
Space mean speed in ramp influence area, S = 56.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 56.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2450 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 320 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2450	320	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	631	82	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2677	338	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2677$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 3015 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2677	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.356
S
Space mean speed in ramp influence area, S = 56.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 56.8 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2770 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 714 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1514 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1514 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2770 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 420 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2770	420	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	714	108	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 3027 444 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3027$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3027	4700	No
Fi F			
$v = v - v$	2583	4700	No
FO F R			
v	444	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3027	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 12.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.338$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2350 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 360 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2350	360	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	606	93	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2568	380	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2568$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2948	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2568	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.370
S
Space mean speed in ramp influence area, S = 56.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 56.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/12/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative NP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2710 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 60 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2710	60	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	698	15	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2961	63	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2961$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3024	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2961	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.356
S
Space mean speed in ramp influence area, S = 56.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 56.8 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/12/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Cumulative NP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2770 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 714 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1514 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1514 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2770 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 660 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2770	660	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	714	170	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 3027 697 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3027$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3027	4700	No
Fi F			
$v = v - v$	2330	4700	No
FO F R			
v	697	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3027	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 16.8$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.101$
S
Space mean speed in ramp influence area, $S = 62.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3830 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 660 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3830	660	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	987	170	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4106	697	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4106$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4803	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4106	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.601
S
Space mean speed in ramp influence area, S = 51.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4840 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1030 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4840	1030	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1247	265	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5289	1088	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5289$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5289	4700	Yes
Fi F			
v = v - v	4201	4700	No
FO F R			
v	1088	2200	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v	5289	4600	No
12			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 36.2$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.136$
S
Space mean speed in ramp influence area, $S = 61.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4500 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1030 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	4500	1030	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1160	265	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4825	1088	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4825$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5913	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4825	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 41.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.568
S
Space mean speed in ramp influence area, S = 28.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 28.9 mph

Leisch Method for Weaving Analysis

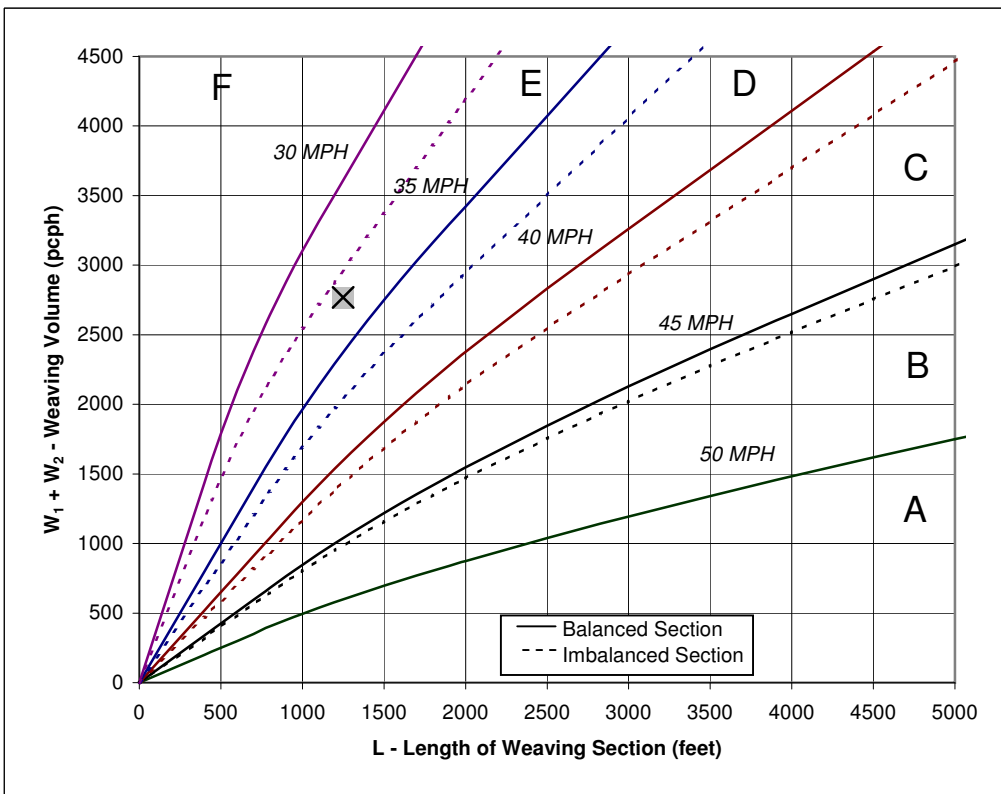
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

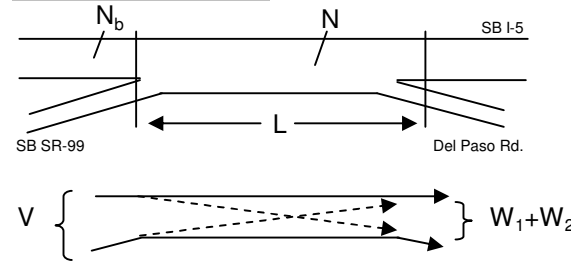
Project Information

Project	South Sutter County
Scenario	Cumulative - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,920	Volume (vph)*	2,110	Volume (vph)*	590
Truck Percentage	12%	Truck Percentage	5%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	6,275	Volume (pcph)	2,163	Volume (pcph)	605



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **31.1**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **1,871**
- Level of Service (LOS) **E**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	8330	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	8330	4500
Lanes	3	2
Capacity Check	LOS F	OK

f_{HV}	0.9615
----------	--------

v_i	8931.134	pc/hr/ln
-------	----------	----------

Density, D	32.4	pc/mi/ln
-------------------	------	----------

LOS	LOS F
------------	-------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



CUMULATIVE CONDITIONS
PLUS PHASE 1 PROJECT
NO PLACER PARKWAY

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	10	10	10	10	10	10
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)	11	11	11	11	11	11	11	11	11	11	11	11
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	92	82	16	92	82	16	22			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92	82	16	92	82	16	22			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	864	798	1063	864	798	1063	1594			1594		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	33	33	33	33								
Volume Left	11	11	11	11								
Volume Right	11	11	11	11								
cSH	895	895	1594	1594								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	1								
Control Delay (s)	9.2	9.2	2.5	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	2.5	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization			13.3%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

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
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	10	10	10	90	10	30	10	1330	30	110	2990	10
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)	11	11	11	98	11	33	11	1446	33	120	3250	11
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	11	12	0	98	11	33	11	1446	33	120	3250	11
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		Free	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						Free			Free			Free
Actuated Green, G (s)	1.3	6.0		8.7	13.4	122.5	0.7	81.7	122.5	10.1	91.1	122.5
Effective Green, g (s)	1.3	6.0		8.7	13.4	122.5	0.7	81.7	122.5	10.1	91.1	122.5
Actuated g/C Ratio	0.01	0.05		0.07	0.11	1.00	0.01	0.67	1.00	0.08	0.74	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	19	84		244	204	1583	10	1926	1583	146	2486	1583
v/s Ratio Prot	0.01	c0.01		c0.03	0.01		0.01	0.50		c0.07	c0.97	
v/s Ratio Perm						0.02			0.02			0.01
v/c Ratio	0.58	0.14		0.40	0.05	0.02	1.10	0.75	0.02	0.82	1.31	0.01
Uniform Delay, d1	60.3	55.8		54.4	48.9	0.0	60.9	13.6	0.0	55.3	15.7	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.3	0.7		1.1	0.1	0.0	321.8	1.7	0.0	29.6	141.3	0.0
Delay (s)	96.6	56.5		55.5	49.0	0.0	382.7	15.3	0.0	84.9	157.0	0.0
Level of Service	F	E		E	D	A	F	B	A	F	F	A
Approach Delay (s)		69.9			42.1			17.7			153.9	
Approach LOS		E			D			B			F	













Intersection Summary

HCM Average Control Delay	110.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	122.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group





















HCM Signalized Intersection Capacity Analysis
3: Sankey Rd & Road "H"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	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)	0	60	80	60	110	0	10	0	10	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)	0	65	87	65	120	0	11	0	11	0	0	0
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	10	0	0	0
Lane Group Flow (vph)	0	65	60	65	120	0	11	0	1	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		51.7	51.7	5.8	61.5		5.6		5.6			
Effective Green, g (s)		51.7	51.7	5.8	61.5		5.6		5.6			
Actuated g/C Ratio		0.69	0.69	0.08	0.82		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)		1283	1090	137	1526		132		118			
v/s Ratio Prot		0.03		c0.04	c0.06		c0.01					
v/s Ratio Perm			0.04						0.00			
v/c Ratio		0.05	0.05	0.47	0.08		0.08		0.01			
Uniform Delay, d1		3.8	3.8	33.2	1.3		32.4		32.2			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.1	0.1	2.6	0.1		0.3		0.0			
Delay (s)		3.9	3.9	35.8	1.4		32.6		32.2			
Level of Service		A	A	D	A		C		C			
Approach Delay (s)		3.9			13.5			32.4			0.0	
Approach LOS		A			B			C			A	
Intersection Summary												
HCM Average Control Delay			10.6			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.11									
Actuated Cycle Length (s)			75.1			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			20.0%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												


































HCM Signalized Intersection Capacity Analysis
4: Riego Rd & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.97		1.00	0.93		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1806		1770	1723		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1723		1770	1806		1770	1723		1770	1723	
Volume (vph)	10	20	20	90	40	10	10	10	10	10	10	10
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)	11	22	22	98	43	11	11	11	11	11	11	11
RTOR Reduction (vph)	0	20	0	0	10	0	0	5	0	0	5	0
Lane Group Flow (vph)	11	24	0	98	44	0	11	17	0	11	17	0
Turn Type	Split		Split		Prot		Prot					
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.7	4.7		5.2	5.2		0.6	33.0		0.6	33.0	
Effective Green, g (s)	4.7	4.7		5.2	5.2		0.6	33.0		0.6	33.0	
Actuated g/C Ratio	0.08	0.08		0.09	0.09		0.01	0.55		0.01	0.55	
Clearance Time (s)	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	
Lane Grp Cap (vph)	140	136		155	158		18	956		18	956	
v/s Ratio Prot	0.01	c0.01		c0.06	0.02		c0.01	c0.01		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.08	0.17		0.63	0.28		0.61	0.02		0.61	0.02	
Uniform Delay, d1	25.4	25.6		26.2	25.4		29.3	6.0		29.3	6.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.6		8.1	1.0		48.7	0.0		48.7	0.0	
Delay (s)	25.6	26.2		34.4	26.4		78.0	6.0		78.0	6.0	
Level of Service	C	C		C	C		E	A		E	A	
Approach Delay (s)		26.1			31.5			30.0			30.0	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			30.1	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.12									
Actuated Cycle Length (s)			59.5	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			25.5%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	50	240	420	1720	900	50	700	1270	800	80	2770	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)	54	261	457	1870	978	54	761	1380	870	87	3011	261
RTOR Reduction (vph)	0	0	196	0	0	37	0	0	0	0	0	0
Lane Group Flow (vph)	54	261	261	1870	978	17	761	1380	870	87	3011	261
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	4.0	17.8	17.8	35.0	48.8	48.8	28.0	81.5	160.8	10.5	64.0	160.8
Effective Green, g (s)	4.0	17.8	17.8	35.0	48.8	48.8	28.0	81.5	160.8	10.5	64.0	160.8
Actuated g/C Ratio	0.02	0.11	0.11	0.22	0.30	0.30	0.17	0.51	1.00	0.07	0.40	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	85	563	175	747	1543	480	308	1464	1583	116	1331	1583
v/s Ratio Prot	0.02	0.05		c0.54	0.19		c0.43	0.48		0.05	c0.90	
v/s Ratio Perm			c0.17			0.01			0.55			0.16
v/c Ratio	0.64	0.46	1.49	2.50	0.63	0.04	2.47	0.94	0.55	0.75	2.26	0.16
Uniform Delay, d1	77.7	67.0	71.5	62.9	48.3	39.4	66.4	37.4	0.0	73.9	48.4	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.5	0.6	249.7	680.5	0.9	0.0	671.5	13.3	1.4	23.5	570.4	0.2
Delay (s)	92.2	67.6	321.2	743.4	49.2	39.5	737.9	50.8	1.4	97.4	618.8	0.2
Level of Service	F	E	F	F	D	D	F	D	A	F	F	A
Approach Delay (s)		219.5			496.3			210.2			557.2	
Approach LOS		F			F			F			F	


































Intersection Summary

HCM Average Control Delay	409.6	HCM Level of Service	F
HCM Volume to Capacity ratio	2.27		
Actuated Cycle Length (s)	160.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	182.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue













Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	1863	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	1863	1583	3433	3539	1583
Volume (vph)	80	800	10	10	1810	110	100	10	10	100	10	140
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)	87	870	11	11	1967	120	109	11	11	109	11	152
RTOR Reduction (vph)	0	0	6	0	0	54	0	0	10	0	0	57
Lane Group Flow (vph)	87	870	5	11	1967	66	109	11	1	109	11	95
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	4.0	52.4	52.4	0.8	49.2	49.2	7.7	14.4	14.4	41.8	48.5	48.5
Effective Green, g (s)	4.0	52.4	52.4	0.8	49.2	49.2	7.7	14.4	14.4	41.8	48.5	48.5
Actuated g/C Ratio	0.03	0.42	0.42	0.01	0.39	0.39	0.06	0.11	0.11	0.33	0.39	0.39
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)	110	2125	661	22	1995	621	211	214	182	1144	1369	612
v/s Ratio Prot	c0.03	c0.17		0.00	c0.39		c0.03	0.01		0.03	0.00	
v/s Ratio Perm			0.00			0.04			0.00			c0.06
v/c Ratio	0.79	0.41	0.01	0.50	0.99	0.11	0.52	0.05	0.01	0.10	0.01	0.16
Uniform Delay, d1	60.3	25.6	21.3	62.1	37.8	24.2	57.0	49.4	49.2	28.8	23.7	25.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.0	0.6	0.0	16.8	17.1	0.3	2.1	0.1	0.0	0.2	0.0	0.5
Delay (s)	91.3	26.2	21.3	78.9	54.9	24.5	59.2	49.5	49.2	28.9	23.7	25.6
Level of Service	F	C	C	E	D	C	E	D	D	C	C	C
Approach Delay (s)		32.0			53.2			57.5			26.9	
Approach LOS		C			D			E			C	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	125.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1583	1770	3539		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1583	1770	3539		1770		1583			
Volume (vph)	0	900	10	40	1230	0	340	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)	0	978	11	43	1337	0	370	0	22	0	0	0
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	15	0	0	0
Lane Group Flow (vph)	0	978	5	43	1337	0	370	0	7	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		4		3	8		5					
Permitted Phases			4						2			
Actuated Green, G (s)		19.7	19.7	1.3	25.0		13.9		13.9			
Effective Green, g (s)		19.7	19.7	1.3	25.0		13.9		13.9			
Actuated g/C Ratio		0.42	0.42	0.03	0.53		0.30		0.30			
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)		1487	665	49	1886		525		469			
v/s Ratio Prot		0.28		0.02	c0.38		c0.21					
v/s Ratio Perm			0.00						0.00			
v/c Ratio		0.66	0.01	0.88	0.71		0.70		0.01			
Uniform Delay, d1		10.9	7.9	22.7	8.2		14.7		11.7			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		1.1	0.0	83.1	1.2		4.3		0.0			
Delay (s)		12.0	7.9	105.8	9.5		19.0		11.7			
Level of Service		B	A	F	A		B		B			
Approach Delay (s)		11.9			12.5			18.5			0.0	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM Average Control Delay			13.1			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			46.9			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			59.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↘	↘
Sign Control		Stop	Stop		Stop	
Volume (vph)	50	870	1180	80	150	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	946	1283	87	163	98
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	1000	1283	87	261		
Volume Left (vph)	54	0	0	163		
Volume Right (vph)	0	0	87	98		
Hadj (s)	0.04	0.03	-0.67	-0.07		
Departure Headway (s)	6.0	6.3	5.6	6.9		
Degree Utilization, x	1.67	2.26	0.14	0.50		
Capacity (veh/h)	608	579	630	517		
Control Delay (s)	322.8	584.9	8.3	16.6		
Approach Delay (s)	322.8	548.3		16.6		
Approach LOS	F	F		C		
Intersection Summary						
Delay			409.8			
HCM Level of Service			F			
Intersection Capacity Utilization			107.1%		ICU Level of Service	G
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	↗
Sign Control	Stop			Stop	Stop	
Volume (vph)	880	140	60	1170	90	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	957	152	65	1272	98	22
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	957	152	1337	120		
Volume Left (vph)	0	0	65	98		
Volume Right (vph)	0	152	0	22		
Hadj (s)	0.03	-0.67	0.04	0.09		
Departure Headway (s)	5.6	4.9	5.4	7.1		
Degree Utilization, x	1.50	0.21	1.99	0.23		
Capacity (veh/h)	629	720	681	504		
Control Delay (s)	247.0	8.0	465.6	12.2		
Approach Delay (s)	214.2		465.6	12.2		
Approach LOS	F		F	B		
Intersection Summary						
Delay			335.8			
HCM Level of Service			F			
Intersection Capacity Utilization			123.3%	ICU Level of Service	H	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	850	40	90	1150	40	70	10	50	50	10	10
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)	11	924	43	98	1250	43	76	11	54	54	11	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	978	1391	141	76
Volume Left (vph)	11	98	76	54
Volume Right (vph)	43	43	54	11
Hadj (s)	0.01	0.03	-0.09	0.09
Departure Headway (s)	5.8	5.8	7.3	7.8
Degree Utilization, x	1.56	2.23	0.29	0.17
Capacity (veh/h)	617	635	481	441
Control Delay (s)	277.1	572.7	13.2	12.4
Approach Delay (s)	277.1	572.7	13.2	12.4
Approach LOS	F	F	B	B

Intersection Summary			
Delay		413.9	
HCM Level of Service		F	
Intersection Capacity Utilization		133.5%	ICU Level of Service H
Analysis Period (min)		15	

HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd



































Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

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	0.91	1.00	1.00	0.91	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	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	850	40	170	1210	50	50	40	220	90	40	10
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)	11	924	43	185	1315	54	54	43	239	98	43	11
RTOR Reduction (vph)	0	0	30	0	0	34	0	0	207	0	0	10
Lane Group Flow (vph)	11	924	13	185	1315	20	54	43	32	98	43	1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	0.6	26.6	26.6	7.1	33.1	33.1	33.8	12.2	12.2	29.5	7.9	7.9
Effective Green, g (s)	0.6	26.6	26.6	7.1	33.1	33.1	33.8	12.2	12.2	29.5	7.9	7.9
Actuated g/C Ratio	0.01	0.29	0.29	0.08	0.36	0.36	0.37	0.13	0.13	0.32	0.09	0.09
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)	12	1480	461	137	1842	573	655	249	211	571	161	137
v/s Ratio Prot	0.01	0.18		c0.10	c0.26		0.03	c0.02		c0.06	c0.02	
v/s Ratio Perm			0.01			0.01			0.02			0.00
v/c Ratio	0.92	0.62	0.03	1.35	0.71	0.03	0.08	0.17	0.15	0.17	0.27	0.01
Uniform Delay, d1	45.4	28.1	23.2	42.2	25.1	18.8	18.7	35.1	35.0	22.2	39.0	38.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	212.2	0.8	0.0	198.0	2.4	0.1	0.2	0.3	0.3	0.7	0.9	0.0
Delay (s)	257.5	28.9	23.2	240.1	27.5	18.9	19.0	35.5	35.4	22.8	39.9	38.2
Level of Service	F	C	C	F	C	B	B	D	D	C	D	D
Approach Delay (s)		31.2			52.5			32.7			28.8	
Approach LOS		C			D			C			C	

Intersection Summary		
HCM Average Control Delay	42.2	HCM Level of Service D
HCM Volume to Capacity ratio	0.50	
Actuated Cycle Length (s)	91.4	Sum of lost time (s) 16.0
Intersection Capacity Utilization	48.4%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	810	1260	110	680	1470	20	110	990	590	30	900	910
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)	880	1370	120	739	1598	22	120	1076	641	33	978	989
RTOR Reduction (vph)	0	0	50	0	0	11	0	0	304	0	0	300
Lane Group Flow (vph)	880	1370	70	739	1598	11	120	1076	337	33	978	689
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	30.0	38.3	38.3	30.1	38.0	38.0	4.0	47.9	47.9	2.4	46.3	46.3
Effective Green, g (s)	30.0	40.3	40.3	29.7	40.0	40.0	4.0	48.2	48.2	2.4	46.6	46.6
Actuated g/C Ratio	0.22	0.30	0.30	0.22	0.29	0.29	0.03	0.35	0.35	0.02	0.34	0.34
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.3
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	754	1500	467	746	1489	464	101	1794	559	60	1735	540
v/s Ratio Prot	c0.26	0.27		0.22	c0.31		c0.03	0.21		0.01	0.19	
v/s Ratio Perm			0.04			0.01			0.21			c0.43
v/c Ratio	1.17	0.91	0.15	0.99	1.07	0.02	1.19	0.60	0.60	0.55	0.56	1.28
Uniform Delay, d1	53.3	46.5	35.5	53.3	48.3	34.4	66.3	36.3	36.3	66.6	36.7	45.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	89.2	8.7	0.1	30.5	45.7	0.0	148.7	0.4	1.3	10.5	0.3	137.7
Delay (s)	142.5	55.1	35.6	83.8	94.0	34.4	215.0	36.6	37.6	77.0	37.0	182.7
Level of Service	F	E	D	F	F	C	F	D	D	E	D	F
Approach Delay (s)		86.6			90.2			48.6			109.7	
Approach LOS		F			F			D			F	
Intersection Summary												
HCM Average Control Delay			84.9			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			136.6			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			98.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	320	960	40	270	1010	400	10	1200	280	360	840	640
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)	348	1043	43	293	1098	435	11	1304	304	391	913	696
RTOR Reduction (vph)	0	0	32	0	0	122	0	0	149	0	0	173
Lane Group Flow (vph)	348	1043	11	293	1098	313	11	1304	155	391	913	523
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	12.0	29.3	29.3	11.7	29.0	29.0	0.6	44.2	44.2	13.0	56.6	56.6
Effective Green, g (s)	12.0	31.3	31.3	11.7	31.0	31.0	0.6	46.2	46.2	13.0	58.6	58.6
Actuated g/C Ratio	0.10	0.26	0.26	0.10	0.26	0.26	0.01	0.39	0.39	0.11	0.50	0.50
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	349	1347	419	340	1334	415	17	1383	619	378	1755	785
v/s Ratio Prot	c0.10	0.21		0.09	c0.22		0.00	c0.37		c0.11	0.26	
v/s Ratio Perm			0.01			0.20			0.10			0.33
v/c Ratio	1.00	0.77	0.03	0.86	0.82	0.75	0.65	0.94	0.25	1.03	0.52	0.67
Uniform Delay, d1	53.1	40.2	32.2	52.5	41.0	40.1	58.7	34.7	24.3	52.6	20.2	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	47.1	3.3	0.1	18.9	4.7	8.8	49.2	13.3	0.4	55.5	0.5	2.7
Delay (s)	100.2	43.5	32.2	71.4	45.7	48.8	107.9	48.0	24.7	108.1	20.7	25.2
Level of Service	F	D	C	E	D	D	F	D	C	F	C	C
Approach Delay (s)		56.9			50.6			44.0			39.4	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay			47.1			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			118.2	Sum of lost time (s)			16.0					
Intersection Capacity Utilization			85.4%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	20	0	0	60	10	0	0	0	90	0	10
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)	11	22	0	0	65	11	0	0	0	98	0	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	33	76	0	109								
Volume Left (vph)	11	0	0	98								
Volume Right (vph)	0	11	0	11								
Hadj (s)	0.10	-0.05	0.00	0.15								
Departure Headway (s)	4.3	4.1	4.3	4.3								
Degree Utilization, x	0.04	0.09	0.00	0.13								
Capacity (veh/h)	803	845	824	816								
Control Delay (s)	7.5	7.5	7.3	7.9								
Approach Delay (s)	7.5	7.5	0.0	7.9								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.7									
HCM Level of Service			A									
Intersection Capacity Utilization			20.5%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

												
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	370	10	0	970	330	0	0	150	0	0	70
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	402	11	0	1054	359	0	0	163	0	0	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.29						0.29	0.29		0.29	0.29	0.29
vC, conflicting volume	1413			413			1717	1821	408	1804	1647	1234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2424			413			3473	3829	408	3773	3230	1806
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			100			0	100	75	100	100	0
cM capacity (veh/h)	57			1146			0	1	644	0	3	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	413	1413	163	76								
Volume Left	0	0	0	0								
Volume Right	11	359	163	76								
cSH	1700	1700	644	29								
Volume to Capacity	0.24	0.83	0.25	2.67								
Queue Length 95th (ft)	0	0	25	227								
Control Delay (s)	0.0	0.0	12.5	1046.7								
Lane LOS			B	F								
Approach Delay (s)	0.0	0.0	12.5	1046.7								
Approach LOS			B	F								
Intersection Summary												
Average Delay			39.5									
Intersection Capacity Utilization			82.1%		ICU Level of Service				E			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

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	0.95			1.00	1.00					1.00	
Frt	1.00	1.00			1.00	0.85					0.94	
Flt Protected	0.95	1.00			1.00	1.00					0.97	
Satd. Flow (prot)	1770	3539			1863	1583					1709	
Flt Permitted	0.95	1.00			1.00	1.00					0.97	
Satd. Flow (perm)	1770	3539			1863	1583					1709	
Volume (vph)	70	450	0	0	1230	10	0	0	0	100	0	70
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)	76	489	0	0	1337	11	0	0	0	109	0	76
RTOR Reduction (vph)	0	0	0	0	0	2	0	0	0	0	22	0
Lane Group Flow (vph)	76	489	0	0	1337	9	0	0	0	0	163	0
Turn Type	Prot				Perm				Split			
Protected Phases	5	2			6					4	4	
Permitted Phases						6						
Actuated Green, G (s)	5.0	94.1			85.1	85.1					15.0	
Effective Green, g (s)	5.0	94.1			85.1	85.1					15.0	
Actuated g/C Ratio	0.04	0.80			0.73	0.73					0.13	
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)	76	2844			1354	1150					219	
v/s Ratio Prot	c0.04	0.14			c0.72						c0.10	
v/s Ratio Perm						0.01						
v/c Ratio	1.00	0.17			0.99	0.01					0.75	
Uniform Delay, d1	56.0	2.6			15.5	4.4					49.2	
Progression Factor	1.00	1.00			1.00	1.00					1.00	
Incremental Delay, d2	103.2	0.0			21.3	0.0					12.9	
Delay (s)	159.3	2.6			36.7	4.4					62.1	
Level of Service	F	A			D	A					E	
Approach Delay (s)		23.7			36.5			0.0			62.1	
Approach LOS		C			D			A			E	
Intersection Summary												
HCM Average Control Delay			35.3				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			117.1				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			81.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM



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	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)	230	790	1280	220	230	470
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	859	1391	239	250	511
RTOR Reduction (vph)	0	0	0	132	0	230
Lane Group Flow (vph)	250	859	1391	107	250	281
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	14.5	58.5	40.0	40.0	23.0	23.0
Effective Green, g (s)	14.5	58.5	40.0	40.0	23.0	23.0
Actuated g/C Ratio	0.16	0.65	0.45	0.45	0.26	0.26
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)	287	2313	1582	707	455	407
v/s Ratio Prot	c0.14	0.24	c0.39		0.14	
v/s Ratio Perm				0.07		c0.18
v/c Ratio	0.87	0.37	0.88	0.15	0.55	0.69
Uniform Delay, d1	36.6	7.1	22.5	14.7	28.8	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.8	0.1	7.3	0.5	4.7	9.3
Delay (s)	60.4	7.2	29.9	15.1	33.5	39.3
Level of Service	E	A	C	B	C	D
Approach Delay (s)		19.2	27.7		37.4	
Approach LOS		B	C		D	

Intersection Summary

HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			


































HCM Signalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

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	0.95	1.00	1.00	0.95	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	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	200	730	230	170	1100	230	180	250	90	140	350	230
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)	217	793	250	185	1196	250	196	272	98	152	380	250
RTOR Reduction (vph)	0	0	170	0	0	167	0	0	71	0	0	186
Lane Group Flow (vph)	217	793	80	185	1196	83	196	272	27	152	380	64
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	11.0	28.7	28.7	12.3	30.0	30.0	10.0	25.0	25.0	8.0	23.0	23.0
Effective Green, g (s)	11.0	28.7	28.7	12.3	30.0	30.0	10.0	25.0	25.0	8.0	23.0	23.0
Actuated g/C Ratio	0.12	0.32	0.32	0.14	0.33	0.33	0.11	0.28	0.28	0.09	0.26	0.26
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)	216	1129	505	242	1180	528	197	518	440	157	476	405
v/s Ratio Prot	c0.12	0.22		0.10	c0.34		c0.11	0.15		0.09	c0.20	
v/s Ratio Perm			0.05			0.05			0.02			0.04
v/c Ratio	1.00	0.70	0.16	0.76	1.01	0.16	0.99	0.53	0.06	0.97	0.80	0.16
Uniform Delay, d1	39.5	26.9	22.0	37.5	30.0	21.1	40.0	27.5	23.9	40.9	31.3	26.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	62.4	3.7	0.7	13.4	29.6	0.6	62.3	3.8	0.3	61.6	13.1	0.8
Delay (s)	101.9	30.6	22.6	50.8	59.6	21.7	102.3	31.3	24.2	102.5	44.4	26.8
Level of Service	F	C	C	D	E	C	F	C	C	F	D	C
Approach Delay (s)		41.3			52.8			54.6			50.1	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			49.1			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			12.0					
Intersection Capacity Utilization			83.2%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM













												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	770	310	470	410	780	420	640	1140	100	210	1360	800
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)	837	337	511	446	848	457	696	1239	109	228	1478	870
RTOR Reduction (vph)	0	0	173	0	0	154	0	0	64	0	0	233
Lane Group Flow (vph)	837	337	338	446	848	303	696	1239	45	228	1478	637
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	26.5	37.2	37.2	20.0	31.0	31.0	22.5	53.1	53.1	12.3	42.9	42.9
Effective Green, g (s)	28.0	38.9	38.9	21.5	32.4	32.4	24.0	54.8	54.8	13.8	44.6	44.6
Actuated g/C Ratio	0.19	0.27	0.27	0.15	0.22	0.22	0.17	0.38	0.38	0.10	0.31	0.31
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	663	1364	425	509	1136	354	568	1922	598	327	1564	487
v/s Ratio Prot	c0.24	0.07		0.13	0.17		c0.20	0.24		0.07	0.29	
v/s Ratio Perm			c0.21			0.19			0.03			c0.40
v/c Ratio	1.26	0.25	0.80	0.88	0.75	0.86	1.23	0.64	0.08	0.70	0.95	1.31
Uniform Delay, d1	58.5	41.6	49.4	60.4	52.5	54.1	60.5	37.1	28.9	63.6	49.0	50.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	130.0	0.3	11.9	15.1	3.3	19.6	116.4	1.1	0.1	5.2	12.5	152.5
Delay (s)	188.5	41.8	61.3	75.5	55.7	73.6	176.9	38.2	29.0	68.7	61.5	202.7
Level of Service	F	D	E	E	E	E	F	D	C	E	E	F
Approach Delay (s)		120.6			65.5			84.9			109.8	
Approach LOS		F			E			F			F	

Intersection Summary

HCM Average Control Delay	96.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			













HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

													
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	
Lane Util. Factor		0.91	1.00		0.95	1.00				0.97		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		5085	1583		3539	1583				3433		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		5085	1583		3539	1583				3433		1583	
Volume (vph)	0	280	170	0	670	940	0	0	0	280	0	250	
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	304	185	0	728	1022	0	0	0	304	0	272	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	89	
Lane Group Flow (vph)	0	304	185	0	728	1022	0	0	0	304	0	183	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		25.0	44.4		25.0	44.4				11.4		11.4	
Effective Green, g (s)		25.0	44.4		25.0	44.4				11.4		11.4	
Actuated g/C Ratio		0.56	1.00		0.56	1.00				0.26		0.26	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2863	1583		1993	1583				881		406	
v/s Ratio Prot		0.06			0.21					0.09			
v/s Ratio Perm			0.12			0.65						0.12	
v/c Ratio		0.11	0.12		0.37	0.65				0.35		0.45	
Uniform Delay, d1		4.5	0.0		5.3	0.0				13.5		13.9	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.2		0.5	2.0				0.2		0.8	
Delay (s)		4.5	0.2		5.9	2.0				13.7		14.7	
Level of Service		A	A		A	A				B		B	
Approach Delay (s)		2.9			3.6			0.0			14.2		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			5.7									HCM Level of Service	A
HCM Volume to Capacity ratio			0.65										
Actuated Cycle Length (s)			44.4									Sum of lost time (s)	0.0
Intersection Capacity Utilization			40.7%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													













HCM Signalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

												
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		0.95	1.00		0.91	1.00	0.97		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3539	1583		5085	1583	3433		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3539	1583		5085	1583	3433		1583			
Volume (vph)	0	430	130	0	1400	380	210	0	560	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)	0	467	141	0	1522	413	228	0	609	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	467	141	0	1522	413	228	0	609	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		29.9	47.2		29.9	47.2	9.3		47.2			
Effective Green, g (s)		29.9	47.2		29.9	47.2	9.3		47.2			
Actuated g/C Ratio		0.63	1.00		0.63	1.00	0.20		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2242	1583		3221	1583	676		1583			
v/s Ratio Prot		0.13			c0.30		0.07					
v/s Ratio Perm			0.09			0.26			c0.38			
v/c Ratio		0.21	0.09		0.47	0.26	0.34		0.38			
Uniform Delay, d1		3.7	0.0		4.5	0.0	16.3		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.2	0.1		0.1	0.4	0.3		0.7			
Delay (s)		3.9	0.1		4.6	0.4	16.6		0.7			
Level of Service		A	A		A	A	B		A			
Approach Delay (s)		3.0			3.7			5.0			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			3.9				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			47.2				Sum of lost time (s)		4.0			
Intersection Capacity Utilization			39.7%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

												
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	0.91		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	5085		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		5085	1583	1770	5085		1770		1583			
Volume (vph)	0	480	100	910	1130	0	160	0	420	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)	0	522	109	989	1228	0	174	0	457	0	0	0
RTOR Reduction (vph)	0	0	92	0	0	0	0	0	394	0	0	0
Lane Group Flow (vph)	0	522	17	989	1228	0	174	0	63	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		16.2	16.2	70.9	90.6		16.6		16.6			
Effective Green, g (s)		17.7	17.7	70.4	92.1		16.1		16.1			
Actuated g/C Ratio		0.15	0.15	0.61	0.79		0.14		0.14			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		775	241	1072	4030		245		219			
v/s Ratio Prot		c0.10		c0.56	0.24		c0.10					
v/s Ratio Perm			0.01						0.04			
v/c Ratio		0.67	0.07	0.92	0.30		0.71		0.29			
Uniform Delay, d1		46.5	42.2	20.5	3.3		47.8		44.9			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		2.3	0.1	12.6	0.0		7.8		0.3			
Delay (s)		48.8	42.3	33.0	3.3		55.6		45.2			
Level of Service		D	D	C	A		E		D			
Approach Delay (s)		47.7			16.6			48.1			0.0	
Approach LOS		D			B			D			A	
Intersection Summary												
HCM Average Control Delay			27.9				HCM Level of Service		C			
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			116.2				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			78.6%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

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	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	5085			5085	1583				1770		1583	
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00	
Satd. Flow (perm)	1770	5085			5085	1583				1770		1583	
Volume (vph)	100	920	0	0	1940	10	0	0	0	30	0	130	
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)	109	1000	0	0	2109	11	0	0	0	33	0	141	
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	0	0	0	123	
Lane Group Flow (vph)	109	1000	0	0	2109	7	0	0	0	33	0	18	
Turn Type	Prot			Perm						Prot		custom	
Protected Phases	5	2			6					8			
Permitted Phases						6						8	
Actuated Green, G (s)	5.3	48.5			39.2	39.2				8.3		8.3	
Effective Green, g (s)	5.3	48.5			39.2	39.2				8.3		8.3	
Actuated g/C Ratio	0.08	0.75			0.60	0.60				0.13		0.13	
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)	145	3806			3076	958				227		203	
v/s Ratio Prot	c0.06	0.20			c0.41					c0.02			
v/s Ratio Perm						0.00						0.01	
v/c Ratio	0.75	0.26			0.69	0.01				0.15		0.09	
Uniform Delay, d1	29.1	2.6			8.6	5.1				25.1		24.9	
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00	
Incremental Delay, d2	19.5	0.0			0.6	0.0				0.3		0.2	
Delay (s)	48.6	2.6			9.3	5.1				25.4		25.1	
Level of Service	D	A			A	A				C		C	
Approach Delay (s)		7.1			9.3			0.0			25.2		
Approach LOS		A			A			A			C		
Intersection Summary													
HCM Average Control Delay			9.4				HCM Level of Service			A			
HCM Volume to Capacity ratio			0.61										
Actuated Cycle Length (s)			64.8				Sum of lost time (s)		12.0				
Intersection Capacity Utilization			56.4%				ICU Level of Service		B				
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
36: Road "D" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1827		1770	1863	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1827		1770	1863	1583	1770	1723		1770	1863	1583
Volume (vph)	70	70	10	10	60	30	10	10	10	50	10	150
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)	76	76	11	11	65	33	11	11	11	54	11	163
RTOR Reduction (vph)	0	5	0	0	0	17	0	10	0	0	0	143
Lane Group Flow (vph)	76	82	0	11	65	16	11	12	0	54	11	20
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases						6						8
Actuated Green, G (s)	2.9	26.1		0.6	23.8	23.8	0.6	4.3		2.5	6.2	6.2
Effective Green, g (s)	2.9	26.1		0.6	23.8	23.8	0.6	4.3		2.5	6.2	6.2
Actuated g/C Ratio	0.06	0.53		0.01	0.48	0.48	0.01	0.09		0.05	0.13	0.13
Clearance Time (s)	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
Lane Grp Cap (vph)	104	963		21	896	761	21	150		89	233	198
v/s Ratio Prot	c0.04	c0.04		0.01	0.03		0.01	0.01		c0.03	0.01	
v/s Ratio Perm						0.01						c0.01
v/c Ratio	0.73	0.08		0.52	0.07	0.02	0.52	0.08		0.61	0.05	0.10
Uniform Delay, d1	22.9	5.8		24.3	6.9	6.7	24.3	20.8		23.0	19.1	19.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	23.0	0.0		21.6	0.0	0.0	21.6	0.2		11.2	0.1	0.2
Delay (s)	45.9	5.8		45.9	6.9	6.8	45.9	21.0		34.2	19.1	19.4
Level of Service	D	A		D	A	A	D	C		C	B	B
Approach Delay (s)		24.5			10.8			29.3			22.9	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM Average Control Delay			21.3				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.14									
Actuated Cycle Length (s)			49.5				Sum of lost time (s)				8.0	
Intersection Capacity Utilization			26.6%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 37: Road "J" & Road "A"

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	40	60	120	50	90	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	65	130	54	98	43
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			109		359	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			109		359	43
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		83	96
cM capacity (veh/h)			1482		584	1027
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	43	65	130	54	98	43
Volume Left	0	0	130	0	98	0
Volume Right	0	65	0	0	0	43
cSH	1700	1700	1482	1700	584	1027
Volume to Capacity	0.03	0.04	0.09	0.03	0.17	0.04
Queue Length 95th (ft)	0	0	7	0	15	3
Control Delay (s)	0.0	0.0	7.7	0.0	12.4	8.7
Lane LOS			A		B	A
Approach Delay (s)	0.0		5.4		11.3	
Approach LOS					B	
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			25.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 38: Road "J" & Road "L"

























Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↑	↗	↙	↘
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	50	30	40	40	50	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	33	43	43	54	141
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			1193			
pX, platoon unblocked						
vC, conflicting volume	87				185	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87				185	43
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				93	86
cM capacity (veh/h)	1509				776	1027
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	54	33	43	43	54	141
Volume Left	54	0	0	0	54	0
Volume Right	0	0	0	43	0	141
cSH	1509	1700	1700	1700	776	1027
Volume to Capacity	0.04	0.02	0.03	0.03	0.07	0.14
Queue Length 95th (ft)	3	0	0	0	6	12
Control Delay (s)	7.5	0.0	0.0	0.0	10.0	9.1
Lane LOS	A				A	A
Approach Delay (s)	4.7		0.0		9.3	
Approach LOS					A	
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			19.4%		ICU Level of Service	A
Analysis Period (min)			15			























HCM Signalized Intersection Capacity Analysis
39: Road "J" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	0.93	1.00
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	1723	1723
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1723	1723
Volume (vph)	10	40	30	120	50	10	20	10	50	30	10	10
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)	11	43	33	130	54	11	22	11	54	33	11	11
RTOR Reduction (vph)	0	0	29	0	0	9	0	0	37	0	8	0
Lane Group Flow (vph)	11	43	4	130	54	2	22	11	17	33	14	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	1.2	10.8	10.8	9.9	19.5	19.5	27.1	28.1	28.1	27.1	28.1	28.1
Effective Green, g (s)	1.2	10.8	10.8	9.9	19.5	19.5	27.1	28.1	28.1	27.1	28.1	28.1
Actuated g/C Ratio	0.01	0.12	0.12	0.11	0.21	0.21	0.29	0.31	0.31	0.29	0.31	0.31
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)	23	219	186	191	395	336	522	570	484	522	527	527
v/s Ratio Prot	0.01	c0.02		c0.07	0.03		0.01	0.01		c0.02	0.01	
v/s Ratio Perm			0.00			0.00			c0.01			
v/c Ratio	0.48	0.20	0.02	0.68	0.14	0.01	0.04	0.02	0.03	0.06	0.03	0.03
Uniform Delay, d1	45.0	36.6	35.9	39.5	29.4	28.6	23.1	22.3	22.4	23.3	22.3	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.8	0.4	0.0	9.6	0.2	0.0	0.2	0.1	0.1	0.2	0.1	0.1
Delay (s)	59.9	37.1	35.9	49.0	29.5	28.6	23.3	22.3	22.5	23.5	22.4	22.4
Level of Service	E	D	D	D	C	C	C	C	C	C	C	C
Approach Delay (s)		39.5			42.5			22.7			23.1	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM Average Control Delay			35.3				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.15									
Actuated Cycle Length (s)			91.9				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			28.3%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												















HCM Signalized Intersection Capacity Analysis
40: Road "J" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	1843		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	1843		1770	1863	1583
Volume (vph)	50	10	40	10	10	10	30	130	10	10	240	40
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)	54	11	43	11	11	11	33	141	11	11	261	43
RTOR Reduction (vph)	0	0	39	0	10	0	0	2	0	0	0	15
Lane Group Flow (vph)	54	11	4	11	12	0	33	150	0	11	261	28
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	3.1	6.7	6.7	0.8	4.4		0.8	44.3		0.8	44.3	44.3
Effective Green, g (s)	3.1	6.7	6.7	0.8	4.4		0.8	44.3		0.8	44.3	44.3
Actuated g/C Ratio	0.05	0.10	0.10	0.01	0.06		0.01	0.65		0.01	0.65	0.65
Clearance Time (s)	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
Lane Grp Cap (vph)	80	182	155	21	111		21	1190		21	1203	1022
v/s Ratio Prot	c0.03	0.01		0.01	c0.01		c0.02	0.08		0.01	c0.14	
v/s Ratio Perm			0.00									0.02
v/c Ratio	0.68	0.06	0.03	0.52	0.11		1.57	0.13		0.52	0.22	0.03
Uniform Delay, d1	32.3	28.1	28.0	33.7	30.2		33.9	4.7		33.7	5.0	4.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	20.2	0.1	0.1	21.6	0.4		406.3	0.2		21.6	0.4	0.0
Delay (s)	52.5	28.2	28.1	55.3	30.7		440.2	4.9		55.3	5.4	4.4
Level of Service	D	C	C	E	C		F	A		E	A	A
Approach Delay (s)		40.3			38.9			82.6			7.0	
Approach LOS		D			D			F			A	
Intersection Summary												
HCM Average Control Delay			36.1				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			68.6				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			35.4%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
41: Road "G" & Road "A"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	130	30	200	40	20	400
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	33	217	43	22	435
RTOR Reduction (vph)	0	27	0	17	0	0
Lane Group Flow (vph)	141	6	217	26	22	435
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	11.9	11.9	38.5	38.5	1.0	43.5
Effective Green, g (s)	11.9	11.9	38.5	38.5	1.0	43.5
Actuated g/C Ratio	0.19	0.19	0.61	0.61	0.02	0.69
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)	332	297	2149	961	28	2428
v/s Ratio Prot	c0.08		0.06		c0.01	c0.12
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.42	0.02	0.10	0.03	0.79	0.18
Uniform Delay, d1	22.7	21.0	5.2	5.0	31.1	3.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.0	0.1	0.1	82.7	0.2
Delay (s)	23.6	21.0	5.3	5.0	113.8	3.7
Level of Service	C	C	A	A	F	A
Approach Delay (s)	23.1		5.3			9.0
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			10.7		HCM Level of Service	B
HCM Volume to Capacity ratio			0.24			
Actuated Cycle Length (s)			63.4		Sum of lost time (s)	8.0
Intersection Capacity Utilization			26.1%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						























HCM Signalized Intersection Capacity Analysis
42: Road "G" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		1770	1793		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		1770	1793		1770	3539	1583	1770	3539	1583
Volume (vph)	10	30	30	120	30	10	20	50	30	10	120	20
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)	11	33	33	130	33	11	22	54	33	11	130	22
RTOR Reduction (vph)	0	29	0	0	8	0	0	0	26	0	0	17
Lane Group Flow (vph)	11	37	0	130	36	0	22	54	7	11	130	5
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases									2			6
Actuated Green, G (s)	0.5	4.8		5.8	10.1		4.5	8.3	8.3	4.5	8.3	8.3
Effective Green, g (s)	0.5	4.8		5.8	10.1		4.5	8.3	8.3	4.5	8.3	8.3
Actuated g/C Ratio	0.01	0.12		0.15	0.26		0.11	0.21	0.21	0.11	0.21	0.21
Clearance Time (s)	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
Lane Grp Cap (vph)	22	210		261	460		202	746	333	202	746	333
v/s Ratio Prot	0.01	c0.02		c0.07	0.02		c0.01	0.02		0.01	c0.04	
v/s Ratio Perm									0.00			0.00
v/c Ratio	0.50	0.18		0.50	0.08		0.11	0.07	0.02	0.05	0.17	0.01
Uniform Delay, d1	19.3	15.5		15.5	11.1		15.7	12.5	12.3	15.6	12.7	12.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.8	0.4		1.5	0.1		0.2	0.0	0.0	0.1	0.1	0.0
Delay (s)	36.1	15.9		17.0	11.2		15.9	12.5	12.4	15.7	12.9	12.3
Level of Service	D	B		B	B		B	B	B	B	B	B
Approach Delay (s)		18.8			15.5			13.1			13.0	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM Average Control Delay			14.7			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			39.4			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			27.8%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
43: Road "G" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1770		1770	1723		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1770		1770	1723		1770	1863	1583	1770	1863	1583
Volume (vph)	10	20	10	170	10	10	10	120	90	20	260	10
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)	11	22	11	185	11	11	11	130	98	22	283	11
RTOR Reduction (vph)	0	10	0	0	8	0	0	0	63	0	0	7
Lane Group Flow (vph)	11	23	0	185	14	0	11	130	35	22	283	4
Turn Type	Prot		Prot			Prot		Perm		Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	0.6	5.3		8.9	13.6		4.2	18.7	18.7	4.2	18.7	18.7
Effective Green, g (s)	0.6	5.3		8.9	13.6		4.2	18.7	18.7	4.2	18.7	18.7
Actuated g/C Ratio	0.01	0.10		0.17	0.26		0.08	0.35	0.35	0.08	0.35	0.35
Clearance Time (s)	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
Lane Grp Cap (vph)	20	177		297	441		140	656	557	140	656	557
v/s Ratio Prot	0.01	c0.01		c0.10	0.01		0.01	0.07		c0.01	c0.15	
v/s Ratio Perm									0.02			0.00
v/c Ratio	0.55	0.13		0.62	0.03		0.08	0.20	0.06	0.16	0.43	0.01
Uniform Delay, d1	26.1	21.8		20.5	14.8		22.7	12.0	11.4	22.8	13.1	11.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.9	0.3		4.0	0.0		1.1	0.7	0.2	2.4	2.1	0.0
Delay (s)	55.0	22.1		24.6	14.8		23.8	12.7	11.6	25.2	15.2	11.2
Level of Service	D	C		C	B		C	B	B	C	B	B
Approach Delay (s)		30.3			23.5			12.7			15.8	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			17.7			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			53.1			Sum of lost time (s)		16.0				
Intersection Capacity Utilization		36.4%				ICU Level of Service		A				
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
44: Road "G" & Road "D"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

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			0.95	
Frt	1.00		0.85				1.00	1.00			0.99	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1770		1583				1770	1863			3495	
Flt Permitted	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (perm)	1770		1583				1770	1863			3495	
Volume (vph)	10	0	40	0	0	0	20	80	0	0	110	10
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)	11	0	43	0	0	0	22	87	0	0	120	11
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	11	0	5	0	0	0	22	87	0	0	128	0
Turn Type	Prot		custom				Prot					
Protected Phases	4						5	2			6	
Permitted Phases			4									
Actuated Green, G (s)	7.8		7.8				1.4	58.5			53.1	
Effective Green, g (s)	7.8		7.8				1.4	58.5			53.1	
Actuated g/C Ratio	0.10		0.10				0.02	0.79			0.71	
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)	186		166				33	1467			2498	
v/s Ratio Prot	c0.01						c0.01	c0.05			0.04	
v/s Ratio Perm			0.00									
v/c Ratio	0.06		0.03				0.67	0.06			0.05	
Uniform Delay, d1	29.9		29.8				36.2	1.8			3.1	
Progression Factor	1.00		1.00				1.00	1.00			1.00	
Incremental Delay, d2	0.1		0.1				40.8	0.0			0.0	
Delay (s)	30.1		29.9				77.0	1.8			3.1	
Level of Service	C		C				E	A			A	
Approach Delay (s)		29.9			0.0			17.0			3.1	
Approach LOS		C			A			B			A	
Intersection Summary												
HCM Average Control Delay			13.2				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			74.3				Sum of lost time (s)				8.0	
Intersection Capacity Utilization			17.8%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM




































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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Volume (vph)	10	10	10	10	130	70	10	10	10	10	10	10
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)	11	11	11	11	141	76	11	11	11	11	11	11
RTOR Reduction (vph)	0	0	9	0	0	60	0	9	0	0	0	10
Lane Group Flow (vph)	11	11	2	11	141	16	11	13	0	11	11	1
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6						8
Actuated Green, G (s)	6.5	8.3	8.3	6.5	8.3	8.3	6.5	8.3		0.7	2.5	2.5
Effective Green, g (s)	6.5	8.3	8.3	6.5	8.3	8.3	6.5	8.3		0.7	2.5	2.5
Actuated g/C Ratio	0.16	0.21	0.21	0.16	0.21	0.21	0.16	0.21		0.02	0.06	0.06
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)	289	738	330	289	738	330	289	359		31	117	99
v/s Ratio Prot	c0.01	0.00		0.01	c0.04		c0.01	0.01		c0.01	c0.01	
v/s Ratio Perm			0.00			0.01						0.00
v/c Ratio	0.04	0.01	0.01	0.04	0.19	0.05	0.04	0.04		0.35	0.09	0.01
Uniform Delay, d1	14.0	12.5	12.5	14.0	13.0	12.6	14.0	12.6		19.3	17.6	17.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0		6.9	0.4	0.0
Delay (s)	14.1	12.5	12.5	14.1	13.1	12.7	14.1	12.6		26.2	17.9	17.5
Level of Service	B	B	B	B	B	B	B	B		C	B	B
Approach Delay (s)		13.0			13.0			13.1			20.5	
Approach LOS		B			B			B			C	

Intersection Summary

HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.10		
Actuated Cycle Length (s)	39.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			







































HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	0.88	0.94	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	2787	4990	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	2787	4990	3539	1583
Volume (vph)	10	110	10	420	520	900	10	20	170	430	30	20
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)	11	120	11	457	565	978	11	22	185	467	33	22
RTOR Reduction (vph)	0	0	6	0	0	404	0	0	161	0	0	17
Lane Group Flow (vph)	11	120	5	457	565	574	11	22	24	467	33	5
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	0.8	44.1	44.1	18.3	61.6	61.6	0.8	13.9	13.9	12.7	25.8	25.8
Effective Green, g (s)	0.8	44.1	44.1	18.3	61.6	61.6	0.8	13.9	13.9	12.7	25.8	25.8
Actuated g/C Ratio	0.01	0.42	0.42	0.17	0.59	0.59	0.01	0.13	0.13	0.12	0.25	0.25
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)	26	2136	665	598	2983	929	26	468	369	604	870	389
v/s Ratio Prot	0.00	0.02		c0.13	0.11		0.00	0.01		c0.09	0.01	
v/s Ratio Perm			0.00			c0.36			c0.01			0.00
v/c Ratio	0.42	0.06	0.01	0.76	0.19	0.62	0.42	0.05	0.07	0.77	0.04	0.01
Uniform Delay, d1	51.9	18.1	17.7	41.3	10.1	14.1	51.9	39.8	39.9	44.8	30.2	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	0.1	0.0	5.8	0.1	3.1	10.7	0.0	0.1	6.1	0.0	0.0
Delay (s)	62.6	18.1	17.7	47.1	10.2	17.1	62.6	39.8	39.9	50.9	30.2	30.0
Level of Service	E	B	B	D	B	B	E	D	D	D	C	C
Approach Delay (s)		21.6			22.0			41.1			48.7	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM Average Control Delay			28.3				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			105.0				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			72.4%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"































Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	0.94	0.91	1.00	0.97	0.91	0.88	0.94	0.95	1.00	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5085	1583	3433	5085	2787	4990	3539	1583	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5085	1583	3433	5085	2787	4990	3539	1583	3433	5085	2787
Volume (vph)	270	710	140	110	1840	150	240	70	40	110	70	590
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)	293	772	152	120	2000	163	261	76	43	120	76	641
RTOR Reduction (vph)	0	0	77	0	0	64	0	0	35	0	0	195
Lane Group Flow (vph)	293	772	75	120	2000	99	261	76	8	120	76	446
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	6.1	52.0	52.0	8.4	54.3	54.3	5.0	20.3	20.3	8.3	23.6	23.6
Effective Green, g (s)	6.1	52.0	52.0	8.4	54.3	54.3	5.0	20.3	20.3	8.3	23.6	23.6
Actuated g/C Ratio	0.06	0.50	0.50	0.08	0.52	0.52	0.05	0.19	0.19	0.08	0.22	0.22
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)	290	2518	784	275	2630	1441	238	684	306	271	1143	626
v/s Ratio Prot	c0.06	0.15		0.03	c0.39		c0.05	0.02		0.03	0.01	
v/s Ratio Perm			0.05			0.04			0.01			c0.16
v/c Ratio	1.01	0.31	0.10	0.44	0.76	0.07	1.10	0.11	0.03	0.44	0.07	0.71
Uniform Delay, d1	49.5	15.8	14.0	46.0	20.2	12.7	50.0	34.9	34.3	46.1	32.0	37.6
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	55.5	0.3	0.2	1.1	2.1	0.1	86.6	0.1	0.0	1.2	0.0	3.8
Delay (s)	105.0	16.1	14.3	47.2	22.3	12.8	136.6	35.0	34.4	47.3	32.1	41.4
Level of Service	F	B	B	D	C	B	F	C	C	D	C	D
Approach Delay (s)		37.3			22.9			104.7			41.4	
Approach LOS		D			C			F			D	

Intersection Summary		
HCM Average Control Delay	36.5	HCM Level of Service D
HCM Volume to Capacity ratio	0.78	
Actuated Cycle Length (s)	105.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	70.8%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		






















HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	200	660	30	70	1480	90	20	30	20	90	60	320
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)	217	717	33	76	1609	98	22	33	22	98	65	348
RTOR Reduction (vph)	0	0	17	0	0	51	0	0	19	0	0	149
Lane Group Flow (vph)	217	717	16	76	1609	47	22	33	3	98	65	199
Turn Type	Prot		Perm	Prot	Perm		Prot	Perm		Prot	Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	6.2	38.3	38.3	5.2	37.3	37.3	1.7	10.8	10.8	7.0	16.1	16.1
Effective Green, g (s)	6.2	38.3	38.3	5.2	37.3	37.3	1.7	10.8	10.8	7.0	16.1	16.1
Actuated g/C Ratio	0.08	0.50	0.50	0.07	0.48	0.48	0.02	0.14	0.14	0.09	0.21	0.21
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)	275	2519	784	119	2454	764	39	260	221	160	388	330
v/s Ratio Prot	c0.06	0.14		0.04	c0.32		0.01	0.02		c0.06	0.03	
v/s Ratio Perm			0.01			0.03			0.00			c0.13
v/c Ratio	0.79	0.28	0.02	0.64	0.66	0.06	0.56	0.13	0.01	0.61	0.17	0.60
Uniform Delay, d1	34.9	11.5	9.9	35.1	15.1	10.7	37.4	29.1	28.7	33.8	25.1	27.7
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	13.9	0.3	0.0	10.7	1.4	0.2	17.3	0.2	0.0	6.8	0.2	3.1
Delay (s)	48.8	11.7	10.0	45.9	16.5	10.8	54.8	29.3	28.7	40.6	25.3	30.8
Level of Service	D	B	A	D	B	B	D	C	C	D	C	C
Approach Delay (s)		20.0			17.5			36.4			32.0	
Approach LOS		C			B			D			C	
Intersection Summary												
HCM Average Control Delay			20.9	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			77.3	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			61.7%	ICU Level of Service				B				
Analysis Period (min)			15									
c Critical Lane Group												



















HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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
Lane Util. Factor	1.00	0.95			0.95	1.00				0.97	1.00	1.00
Frt	1.00	1.00			1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	1770	3539			3539	1583				3433	1583	1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	1770	3539			3539	1583				3433	1583	1583
Volume (vph)	10	680	0	0	1370	130	0	0	0	210	0	10
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)	11	739	0	0	1489	141	0	0	0	228	0	11
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	0	0	0	8
Lane Group Flow (vph)	11	739	0	0	1489	82	0	0	0	228	0	3
Turn Type	Prot					Perm				Prot		custom
Protected Phases	5	2			6					4		
Permitted Phases						6						4
Actuated Green, G (s)	0.8	47.2			42.4	42.4				18.0		18.0
Effective Green, g (s)	0.8	47.2			42.4	42.4				18.0		18.0
Actuated g/C Ratio	0.01	0.64			0.58	0.58				0.25		0.25
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)	19	2282			2050	917				844		389
v/s Ratio Prot	0.01	c0.21			c0.42					c0.07		
v/s Ratio Perm						0.05						0.00
v/c Ratio	0.58	0.32			0.73	0.09				0.27		0.01
Uniform Delay, d1	36.0	5.8			11.2	6.8				22.3		20.8
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	36.3	0.4			2.3	0.2				0.8		0.0
Delay (s)	72.3	6.2			13.5	7.0				23.1		20.9
Level of Service	E	A			B	A				C		C
Approach Delay (s)		7.2			12.9			0.0			23.0	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM Average Control Delay			12.2				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			73.2				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			50.5%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
57: Road "Q" & Road "S"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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
Lane Util. Factor	1.00	1.00			1.00	1.00				1.00		1.00
Frt	1.00	1.00			1.00	0.85				1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)	1770	1863			1863	1583				1770		1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	1770	1863			1863	1583				1770		1583
Volume (vph)	10	10	0	0	10	10	0	0	0	10	0	10
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)	11	11	0	0	11	11	0	0	0	11	0	11
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	0	0	0	8
Lane Group Flow (vph)	11	11	0	0	11	3	0	0	0	11	0	3
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				4			
Permitted Phases					6							4
Actuated Green, G (s)	0.7	12.5			7.8	7.8				6.4		6.4
Effective Green, g (s)	0.7	12.5			7.8	7.8				6.4		6.4
Actuated g/C Ratio	0.03	0.46			0.29	0.29				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)	46	866			540	459				421		377
v/s Ratio Prot	c0.01	0.01			c0.01				c0.01			
v/s Ratio Perm					0.00							0.00
v/c Ratio	0.24	0.01			0.02	0.01				0.03		0.01
Uniform Delay, d1	12.8	3.9			6.8	6.8				7.9		7.8
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	2.7	0.0			0.0	0.0				0.0		0.0
Delay (s)	15.5	3.9			6.8	6.8				7.9		7.8
Level of Service	B	A			A	A				A		A
Approach Delay (s)		9.7			6.8			0.0			7.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			8.1		HCM Level of Service					A		
HCM Volume to Capacity ratio			0.03									
Actuated Cycle Length (s)			26.9		Sum of lost time (s)					12.0		
Intersection Capacity Utilization			17.2%		ICU Level of Service					A		
Analysis Period (min)			15									
c Critical Lane Group												

























HCM Signalized Intersection Capacity Analysis
58: Road "B" North & Road "A"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

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
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
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	1863	1583	1770	1863	1583
Volume (vph)	20	10	10	30	10	10	10	40	10	10	40	40
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)	22	11	11	33	11	11	11	43	11	11	43	43
RTOR Reduction (vph)	0	0	9	0	9	0	0	0	9	0	0	34
Lane Group Flow (vph)	22	11	2	33	13	0	11	43	2	11	43	9
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	4.5	8.2	8.2	4.5	8.2		0.4	7.9	7.9	0.4	7.9	7.9
Effective Green, g (s)	4.5	8.2	8.2	4.5	8.2		0.4	7.9	7.9	0.4	7.9	7.9
Actuated g/C Ratio	0.12	0.22	0.22	0.12	0.22		0.01	0.21	0.21	0.01	0.21	0.21
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)	215	413	351	215	382		19	398	338	19	398	338
v/s Ratio Prot	0.01	0.01		c0.02	c0.01		c0.01	c0.02		0.01	0.02	
v/s Ratio Perm			0.00						0.00			0.01
v/c Ratio	0.10	0.03	0.01	0.15	0.04		0.58	0.11	0.01	0.58	0.11	0.03
Uniform Delay, d1	14.5	11.3	11.2	14.5	11.3		18.2	11.7	11.5	18.2	11.7	11.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.0	0.0	0.3	0.0		36.3	0.1	0.0	36.3	0.1	0.0
Delay (s)	14.7	11.3	11.2	14.9	11.3		54.5	11.8	11.5	54.5	11.8	11.5
Level of Service	B	B	B	B	B		D	B	B	D	B	B
Approach Delay (s)		13.0			13.5			19.0			16.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM Average Control Delay			15.9			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.10									
Actuated Cycle Length (s)			37.0			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			22.2%			ICU Level of Service		A				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
59: Road "B" South & Road "A"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	10	10	10	10	40	10	10	10	60	10	30
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)	11	11	11	11	11	43	11	11	11	65	11	33
RTOR Reduction (vph)	0	0	10	0	0	40	0	0	7	0	0	21
Lane Group Flow (vph)	11	11	1	11	11	3	11	11	4	65	11	12
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	1.1	6.2	6.2	1.1	6.2	6.2	27.0	27.0	27.0	27.0	27.0	27.0
Effective Green, g (s)	1.1	6.2	6.2	1.1	6.2	6.2	27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.01	0.08	0.08	0.01	0.08	0.08	0.35	0.35	0.35	0.35	0.35	0.35
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)	25	149	127	25	149	127	618	651	553	618	651	553
v/s Ratio Prot	c0.01	c0.01		0.01	0.01		0.01	0.01		c0.04	0.01	
v/s Ratio Perm			0.00			0.00			0.00			c0.01
v/c Ratio	0.44	0.07	0.01	0.44	0.07	0.03	0.02	0.02	0.01	0.11	0.02	0.02
Uniform Delay, d1	37.8	32.9	32.7	37.8	32.9	32.8	16.5	16.5	16.4	17.0	16.5	16.5
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	11.9	0.2	0.0	11.9	0.2	0.1	0.1	0.0	0.0	0.3	0.0	0.1
Delay (s)	49.7	33.1	32.7	49.7	33.1	32.9	16.5	16.5	16.4	17.3	16.5	16.6
Level of Service	D	C	C	D	C	C	B	B	B	B	B	B
Approach Delay (s)		38.5			35.7			16.5			17.0	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM Average Control Delay			25.0				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			77.3				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			23.9%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 60: Road "B" North & Pacific Avenue

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	10	10	10	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	11	11	11	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	11				49	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	11				49	16
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	99
cM capacity (veh/h)	1608				954	1063

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	11	11	22	11	11
Volume Left	11	0	0	11	0
Volume Right	0	0	11	0	11
cSH	1608	1700	1700	954	1063
Volume to Capacity	0.01	0.01	0.01	0.01	0.01
Queue Length 95th (ft)	1	0	0	1	1
Control Delay (s)	7.3	0.0	0.0	8.8	8.4
Lane LOS	A			A	A
Approach Delay (s)	3.6		0.0	8.6	
Approach LOS				A	

Intersection Summary					
Average Delay			4.1		
Intersection Capacity Utilization			17.2%	ICU Level of Service	A
Analysis Period (min)			15		



















HCM Signalized Intersection Capacity Analysis
61: Road "B" North & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

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		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	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		1583				1770	1863			1863	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		1583				1770	1863			1863	1583
Volume (vph)	10	0	10	0	0	0	10	40	0	0	80	10
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)	11	0	11	0	0	0	11	43	0	0	87	11
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	11	0	1	0	0	0	11	43	0	0	87	9
Turn Type	Prot		custom				Prot					Perm
Protected Phases	4						5	2			6	
Permitted Phases			4									6
Actuated Green, G (s)	6.2		6.2				1.4	74.3			68.9	68.9
Effective Green, g (s)	6.2		6.2				1.4	74.3			68.9	68.9
Actuated g/C Ratio	0.07		0.07				0.02	0.84			0.78	0.78
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)	124		111				28	1564			1450	1232
v/s Ratio Prot	c0.01						c0.01	0.02			c0.05	
v/s Ratio Perm			0.00									0.01
v/c Ratio	0.09		0.01				0.39	0.03			0.06	0.01
Uniform Delay, d1	38.5		38.3				43.1	1.2			2.3	2.2
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3		0.0				8.9	0.0			0.0	0.0
Delay (s)	38.8		38.3				52.0	1.2			2.3	2.2
Level of Service	D		D				D	A			A	A
Approach Delay (s)		38.6			0.0			11.5			2.3	
Approach LOS		D			A			B			A	
Intersection Summary												
HCM Average Control Delay			9.7				HCM Level of Service				A	
HCM Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			88.5				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			17.2%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
62: Road "B" South & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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		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	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		1583				1770	1863			1863	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		1583				1770	1863			1863	1583
Volume (vph)	40	0	10	0	0	0	10	10	0	0	10	80
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)	43	0	11	0	0	0	11	11	0	0	11	87
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	0	25
Lane Group Flow (vph)	43	0	1	0	0	0	11	11	0	0	11	62
Turn Type	Prot		custom				Prot					Perm
Protected Phases	4						5	2			6	
Permitted Phases			4									6
Actuated Green, G (s)	9.1		9.1				1.3	60.0			54.7	54.7
Effective Green, g (s)	9.1		9.1				1.3	60.0			54.7	54.7
Actuated g/C Ratio	0.12		0.12				0.02	0.78			0.71	0.71
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)	209		187				30	1450			1322	1123
v/s Ratio Prot	c0.02						c0.01	0.01			0.01	
v/s Ratio Perm			0.00									c0.04
v/c Ratio	0.21		0.01				0.37	0.01			0.01	0.05
Uniform Delay, d1	30.7		30.0				37.5	1.9			3.3	3.4
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5		0.0				7.4	0.0			0.0	0.0
Delay (s)	31.2		30.0				44.9	1.9			3.3	3.4
Level of Service	C		C				D	A			A	A
Approach Delay (s)		31.0			0.0			23.4			3.4	
Approach LOS		C			A			C			A	
Intersection Summary												
HCM Average Control Delay			14.5				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.08									
Actuated Cycle Length (s)			77.1				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			17.2%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											













HCM Signalized Intersection Capacity Analysis
64: Elverta Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

													
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	
Lane Util. Factor		0.95	1.00		1.00	1.00				1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (prot)		3539	1583		1863	1583				1770	1583	1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (perm)		3539	1583		1863	1583				1770	1583	1583	
Volume (vph)	0	140	30	0	570	820	0	0	0	140	0	350	
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	152	33	0	620	891	0	0	0	152	0	380	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	151	
Lane Group Flow (vph)	0	152	33	0	620	891	0	0	0	152	0	229	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		25.2	44.2		25.2	44.2				11.0		11.0	
Effective Green, g (s)		25.2	44.2		25.2	44.2				11.0		11.0	
Actuated g/C Ratio		0.57	1.00		0.57	1.00				0.25		0.25	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2018	1583		1062	1583				440		394	
v/s Ratio Prot		0.04			0.33					0.09			
v/s Ratio Perm			0.02			0.56						0.14	
v/c Ratio		0.08	0.02		0.58	0.56				0.35		0.58	
Uniform Delay, d1		4.3	0.0		6.1	0.0				13.6		14.6	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.0		2.3	1.5				0.5		2.2	
Delay (s)		4.3	0.0		8.5	1.5				14.1		16.8	
Level of Service		A	A		A	A				B		B	
Approach Delay (s)		3.5			4.3			0.0			16.0		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			7.1									HCM Level of Service	A
HCM Volume to Capacity ratio			0.56										
Actuated Cycle Length (s)			44.2									Sum of lost time (s)	0.0
Intersection Capacity Utilization			58.3%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
65: Elverta Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

												
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	1.00		0.95	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		3539	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		3539	1583	1770		1583			
Volume (vph)	0	190	90	0	1120	40	270	0	300	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)	0	207	98	0	1217	43	293	0	326	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	207	98	0	1217	43	293	0	326	0	0	0
Turn Type		Free			Free		Prot		Free			
Protected Phases		2			6		4					
Permitted Phases		Free			Free				Free			
Actuated Green, G (s)		26.2	46.8		26.2	46.8	12.6		46.8			
Effective Green, g (s)		26.2	46.8		26.2	46.8	12.6		46.8			
Actuated g/C Ratio		0.56	1.00		0.56	1.00	0.27		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1043	1583		1981	1583	477		1583			
v/s Ratio Prot		0.11			c0.34		c0.17					
v/s Ratio Perm		0.06			0.03		0.21					
v/c Ratio		0.20	0.06		0.61	0.03	0.61		0.21			
Uniform Delay, d1		5.1	0.0		6.9	0.0	15.0		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.4	0.1		0.6	0.0	2.3		0.3			
Delay (s)		5.5	0.1		7.5	0.0	17.3		0.3			
Level of Service		A	A		A	A	B		A			
Approach Delay (s)		3.8			7.2			8.4			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay		7.1			HCM Level of Service				A			
HCM Volume to Capacity ratio		0.61										
Actuated Cycle Length (s)		46.8			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		52.6%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
66: Sankey Rd & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP AM

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
Lane Util. Factor	1.00	1.00			1.00	1.00				1.00		1.00
Frt	1.00	1.00			1.00	0.85				1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)	1770	1863			1863	1583				1770		1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	1770	1863			1863	1583				1770		1583
Volume (vph)	20	10	0	0	60	10	0	0	0	10	0	50
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)	22	11	0	0	65	11	0	0	0	11	0	54
RTOR Reduction (vph)	0	0	0	0	0	5	0	0	0	0	0	47
Lane Group Flow (vph)	22	11	0	0	65	6	0	0	0	11	0	7
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				4			
Permitted Phases					6							4
Actuated Green, G (s)	0.9	32.1			27.2	27.2				6.0		6.0
Effective Green, g (s)	0.9	32.1			27.2	27.2				6.0		6.0
Actuated g/C Ratio	0.02	0.70			0.59	0.59				0.13		0.13
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)	35	1297			1099	934				230		206
v/s Ratio Prot	c0.01	0.01			c0.03				c0.01			
v/s Ratio Perm					0.00							0.00
v/c Ratio	0.63	0.01			0.06	0.01				0.05		0.03
Uniform Delay, d1	22.4	2.1			4.0	3.9				17.5		17.5
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	30.3	0.0			0.1	0.0				0.4		0.3
Delay (s)	52.8	2.1			4.1	3.9				17.9		17.8
Level of Service	D	A			A	A				B		B
Approach Delay (s)		35.9			4.1			0.0			17.8	
Approach LOS		D			A			A			B	
Intersection Summary												
HCM Average Control Delay			15.3		HCM Level of Service					B		
HCM Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			46.1		Sum of lost time (s)					12.0		
Intersection Capacity Utilization			17.8%		ICU Level of Service					A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	20	10	10	10	10	10
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)	11	11	11	11	11	11	22	11	11	11	11	11
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	114	103	16	114	103	16	22			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	114	103	16	114	103	16	22			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	832	771	1063	832	771	1063	1594			1594		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	33	33	43	33								
Volume Left	11	11	22	11								
Volume Right	11	11	11	11								
cSH	872	872	1594	1594								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	1								
Control Delay (s)	9.3	9.3	3.7	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.3	9.3	3.7	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			13.5%				ICU Level of Service			A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

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
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	10	10	10	30	10	70	10	2790	60	40	1550	10
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)	11	11	11	33	11	76	11	3033	65	43	1685	11
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	11	12	0	33	11	76	11	3033	65	43	1685	11
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		Free	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						Free			Free			Free
Actuated Green, G (s)	1.4	8.5		4.3	11.4	131.6	0.7	98.8	131.6	4.0	102.1	131.6
Effective Green, g (s)	1.4	8.5		4.3	11.4	131.6	0.7	98.8	131.6	4.0	102.1	131.6
Actuated g/C Ratio	0.01	0.06		0.03	0.09	1.00	0.01	0.75	1.00	0.03	0.78	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	19	111		112	161	1583	9	2168	1583	54	2594	1583
v/s Ratio Prot	0.01	c0.01		c0.01	0.01		0.01	c1.05		c0.02	c0.50	
v/s Ratio Perm						c0.05			0.04			0.01
v/c Ratio	0.58	0.11		0.29	0.07	0.05	1.22	1.40	0.04	0.80	0.65	0.01
Uniform Delay, d1	64.8	58.0		62.2	55.2	0.0	65.5	16.4	0.0	63.4	6.7	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.3	0.4		1.5	0.2	0.1	385.4	182.4	0.0	54.4	0.6	0.0
Delay (s)	101.1	58.4		63.6	55.4	0.1	450.9	198.8	0.0	117.8	7.2	0.0
Level of Service	F	E		E	E	A	F	F	A	F	A	A
Approach Delay (s)		72.6			22.6			195.5			9.9	
Approach LOS		E			C			F			A	













Intersection Summary

HCM Average Control Delay	126.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	131.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group





















HCM Signalized Intersection Capacity Analysis
 3: Sankey Rd & Road "H"

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

												
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	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)	0	70	30	10	50	0	50	0	80	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)	0	76	33	11	54	0	54	0	87	0	0	0
RTOR Reduction (vph)	0	0	14	0	0	0	0	0	69	0	0	0
Lane Group Flow (vph)	0	76	19	11	54	0	54	0	18	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		31.6	31.6	1.0	36.6		11.4		11.4			
Effective Green, g (s)		31.6	31.6	1.0	36.6		11.4		11.4			
Actuated g/C Ratio		0.56	0.56	0.02	0.65		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)		1051	893	32	1218		360		322			
v/s Ratio Prot		c0.04		c0.01	0.03		c0.03					
v/s Ratio Perm			0.01						0.01			
v/c Ratio		0.07	0.02	0.34	0.04		0.15		0.06			
Uniform Delay, d1		5.5	5.4	27.2	3.5		18.3		18.0			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.0	0.0	6.3	0.0		0.2		0.1			
Delay (s)		5.6	5.4	33.5	3.5		18.5		18.0			
Level of Service		A	A	C	A		B		B			
Approach Delay (s)		5.5			8.6			18.2			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay			11.8			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.10									
Actuated Cycle Length (s)			56.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			17.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

































HCM Signalized Intersection Capacity Analysis
4: Riego Rd & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.86		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1831		1770	1723		1770	1609		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1831		1770	1723		1770	1609		1770	1723	
Volume (vph)	10	80	10	10	20	20	10	10	100	10	10	10
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)	11	87	11	11	22	22	11	11	109	11	11	11
RTOR Reduction (vph)	0	7	0	0	20	0	0	47	0	0	5	0
Lane Group Flow (vph)	11	91	0	11	24	0	11	73	0	11	17	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.3	5.3		4.9	4.9		0.7	35.0		0.7	35.0	
Effective Green, g (s)	5.3	5.3		4.9	4.9		0.7	35.0		0.7	35.0	
Actuated g/C Ratio	0.09	0.09		0.08	0.08		0.01	0.57		0.01	0.57	
Clearance Time (s)	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	
Lane Grp Cap (vph)	152	157		140	136		20	910		20	974	
v/s Ratio Prot	0.01	c0.05		0.01	c0.01		c0.01	c0.05		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.07	0.58		0.08	0.17		0.55	0.08		0.55	0.02	
Uniform Delay, d1	26.0	27.2		26.4	26.6		30.4	6.1		30.4	5.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	5.1		0.2	0.6		28.9	0.0		28.9	0.0	
Delay (s)	26.2	32.3		26.6	27.2		59.3	6.2		59.3	5.9	
Level of Service	C	C		C	C		E	A		E	A	
Approach Delay (s)		31.7			27.1			10.6			23.7	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM Average Control Delay			21.7			HCM Level of Service					C	
HCM Volume to Capacity ratio			0.15									
Actuated Cycle Length (s)			61.9			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			21.1%			ICU Level of Service					A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Volume (vph)	300	1050	1490	1390	710	160	980	2400	1640	80	1370	140
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	309	1082	1536	1433	732	165	1010	2474	1691	82	1412	144
RTOR Reduction (vph)	0	0	283	0	0	49	0	0	0	0	0	0
Lane Group Flow (vph)	309	1082	1253	1433	732	116	1010	2474	1691	82	1412	144
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	12%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	18.9	43.0	43.0	28.0	52.1	52.1	37.0	68.0	160.0	5.0	36.0	160.0
Effective Green, g (s)	18.9	43.0	43.0	28.0	52.1	52.1	37.0	68.0	160.0	5.0	36.0	160.0
Actuated g/C Ratio	0.12	0.27	0.27	0.18	0.33	0.33	0.23	0.42	1.00	0.03	0.22	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	406	1367	425	601	1656	515	409	1421	1583	55	725	1583
v/s Ratio Prot	0.09	0.21		c0.42	0.14		c0.57	0.74		0.05	c0.44	
v/s Ratio Perm			c0.79			0.07			1.07			0.09
v/c Ratio	0.76	0.79	2.95	2.38	0.44	0.22	2.47	1.74	1.07	1.49	1.95	0.09
Uniform Delay, d1	68.4	54.3	58.5	66.0	42.5	39.3	61.5	46.0	80.0	77.5	62.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	3.2	883.1	628.1	0.2	0.2	668.6	336.4	43.3	295.3	431.5	0.1
Delay (s)	76.6	57.6	941.6	694.1	42.7	39.5	730.1	382.4	123.3	372.8	493.5	0.1
Level of Service	E	E	F	F	D	D	F	F	F	F	F	A
Approach Delay (s)		523.5			443.1			365.6			444.0	
Approach LOS		F			F			F			F	

























Intersection Summary

HCM Average Control Delay	429.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.46		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	179.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM













												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	1863	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	1863	1583	3433	3539	1583
Volume (vph)	160	1920	10	10	1280	110	70	10	10	100	10	120
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)	174	2087	11	11	1391	120	76	11	11	109	11	130
RTOR Reduction (vph)	0	0	5	0	0	75	0	0	10	0	0	63
Lane Group Flow (vph)	174	2087	6	11	1391	45	76	11	1	109	11	67
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	8.0	52.5	52.5	0.8	45.3	45.3	4.7	14.2	14.2	40.2	49.7	49.7
Effective Green, g (s)	8.0	52.5	52.5	0.8	45.3	45.3	4.7	14.2	14.2	40.2	49.7	49.7
Actuated g/C Ratio	0.06	0.42	0.42	0.01	0.37	0.37	0.04	0.11	0.11	0.32	0.40	0.40
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)	222	2158	672	22	1862	580	130	214	182	1116	1422	636
v/s Ratio Prot	c0.05	c0.41		0.00	0.27		c0.02	0.01		0.03	0.00	
v/s Ratio Perm			0.00			0.03			0.00			c0.04
v/c Ratio	0.78	0.97	0.01	0.50	0.75	0.08	0.58	0.05	0.01	0.10	0.01	0.11
Uniform Delay, d1	57.0	34.8	20.6	61.3	34.2	25.6	58.5	48.8	48.5	29.1	22.2	23.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.4	13.0	0.0	16.8	2.8	0.3	6.6	0.1	0.0	0.2	0.0	0.3
Delay (s)	73.4	47.8	20.6	78.0	37.0	25.8	65.1	48.9	48.5	29.3	22.2	23.4
Level of Service	E	D	C	E	D	C	E	D	D	C	C	C
Approach Delay (s)		49.6			36.4			61.4			25.9	
Approach LOS		D			D			E			C	

Intersection Summary

HCM Average Control Delay	43.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	123.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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		0.95	1.00	1.00	0.95		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1583	1770	3539		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1583	1770	3539		1770		1583			
Volume (vph)	0	1330	10	20	1000	0	120	0	30	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)	0	1446	11	22	1087	0	130	0	33	0	0	0
RTOR Reduction (vph)	0	0	5	0	0	0	0	0	27	0	0	0
Lane Group Flow (vph)	0	1446	6	22	1087	0	130	0	6	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		4		3	8		5					
Permitted Phases			4						2			
Actuated Green, G (s)		23.0	23.0	0.6	27.6		8.7		8.7			
Effective Green, g (s)		23.0	23.0	0.6	27.6		8.7		8.7			
Actuated g/C Ratio		0.52	0.52	0.01	0.62		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)		1837	822	24	2205		348		311			
v/s Ratio Prot		c0.41		0.01	c0.31		c0.07					
v/s Ratio Perm			0.00						0.00			
v/c Ratio		0.79	0.01	0.92	0.49		0.37		0.02			
Uniform Delay, d1		8.7	5.1	21.8	4.5		15.4		14.4			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		2.3	0.0	145.1	0.2		0.7		0.0			
Delay (s)		11.0	5.1	166.9	4.7		16.1		14.4			
Level of Service		B	A	F	A		B		B			
Approach Delay (s)		10.9			7.9			15.8			0.0	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM Average Control Delay			10.0				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			44.3				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			50.1%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↗	↗
Sign Control		Stop	Stop		Stop	
Volume (vph)	80	1280	960	120	50	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	1391	1043	130	54	65
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	1478	1043	130	120		
Volume Left (vph)	87	0	0	54		
Volume Right (vph)	0	0	130	65		
Hadj (s)	0.05	0.03	-0.67	-0.20		
Departure Headway (s)	5.3	5.6	4.9	6.8		
Degree Utilization, x	2.19	1.63	0.18	0.22		
Capacity (veh/h)	678	648	724	526		
Control Delay (s)	555.7	302.9	7.8	11.7		
Approach Delay (s)	555.7	270.1		11.7		
Approach LOS	F	F		B		
Intersection Summary						
Delay			411.3			
HCM Level of Service			F			
Intersection Capacity Utilization			138.8%		ICU Level of Service	H
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↗	↘
Sign Control	Stop			Stop	Stop	
Volume (vph)	1140	190	40	960	120	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1239	207	43	1043	130	65
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	1239	207	1087	196		
Volume Left (vph)	0	0	43	130		
Volume Right (vph)	0	207	0	65		
Hadj (s)	0.03	-0.67	0.04	-0.03		
Departure Headway (s)	6.0	5.3	5.7	6.9		
Degree Utilization, x	2.07	0.30	1.72	0.38		
Capacity (veh/h)	604	671	639	514		
Control Delay (s)	500.1	9.4	346.4	14.1		
Approach Delay (s)	430.0		346.4	14.1		
Approach LOS	F		F	B		
Intersection Summary						
Delay			366.9			
HCM Level of Service			F			
Intersection Capacity Utilization			100.0%	ICU Level of Service		F
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	1090	100	40	920	50	70	10	190	70	10	10
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)	11	1185	109	43	1000	54	76	11	207	76	11	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	1304	1098	293	98
Volume Left (vph)	11	43	76	76
Volume Right (vph)	109	54	207	11
Hadj (s)	-0.01	0.01	-0.34	0.12
Departure Headway (s)	6.6	6.6	7.3	8.6
Degree Utilization, x	2.40	2.03	0.59	0.23
Capacity (veh/h)	550	551	481	394
Control Delay (s)	650.6	484.9	20.2	14.3
Approach Delay (s)	650.6	484.9	20.2	14.3
Approach LOS	F	F	C	B

Intersection Summary			
Delay		496.9	
HCM Level of Service		F	
Intersection Capacity Utilization	99.9%		ICU Level of Service F
Analysis Period (min)		15	


































HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

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	0.91	1.00	1.00	0.91	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	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	1190	70	260	880	100	60	50	310	60	50	10
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)	11	1293	76	283	957	109	65	54	337	65	54	11
RTOR Reduction (vph)	0	0	49	0	0	59	0	0	299	0	0	10
Lane Group Flow (vph)	11	1293	27	283	957	50	65	54	38	65	54	1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	0.7	32.5	32.5	17.1	48.9	48.9	31.2	12.2	12.2	29.2	10.2	10.2
Effective Green, g (s)	0.7	32.5	32.5	17.1	48.9	48.9	31.2	12.2	12.2	29.2	10.2	10.2
Actuated g/C Ratio	0.01	0.30	0.30	0.16	0.46	0.46	0.29	0.11	0.11	0.27	0.10	0.10
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)	12	1545	481	283	2324	723	516	212	180	483	178	151
v/s Ratio Prot	0.01	c0.25		c0.16	0.19		0.04	c0.03		c0.04	0.03	
v/s Ratio Perm			0.02			0.03			0.02			0.00
v/c Ratio	0.92	0.84	0.06	1.00	0.41	0.07	0.13	0.25	0.21	0.13	0.30	0.01
Uniform Delay, d1	53.1	34.8	26.4	45.0	19.4	16.3	27.9	43.3	43.0	29.4	45.1	43.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	212.2	4.1	0.0	53.5	0.5	0.2	0.5	0.6	0.6	0.6	1.0	0.0
Delay (s)	265.3	38.9	26.4	98.4	20.0	16.5	28.4	43.9	43.6	29.9	46.1	43.8
Level of Service	F	D	C	F	B	B	C	D	D	C	D	D
Approach Delay (s)		40.0			36.2			41.5			37.8	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			38.6				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			107.0				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			57.4%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	1080	1600	140	690	1380	20	150	950	690	20	1040	950
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)	1174	1739	152	750	1500	22	163	1033	750	22	1130	1033
RTOR Reduction (vph)	0	0	41	0	0	11	0	0	295	0	0	336
Lane Group Flow (vph)	1174	1739	111	750	1500	11	163	1033	455	22	1130	697
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	38.0	46.5	46.5	29.9	38.0	38.0	6.0	49.9	49.9	2.4	46.3	46.3
Effective Green, g (s)	38.0	48.5	48.5	29.5	40.0	40.0	6.0	50.2	50.2	2.4	46.6	46.6
Actuated g/C Ratio	0.26	0.33	0.33	0.20	0.27	0.27	0.04	0.34	0.34	0.02	0.32	0.32
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.3
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	890	1682	524	691	1387	432	141	1741	542	56	1616	503
v/s Ratio Prot	c0.34	c0.34		0.22	0.29		c0.05	0.20		0.01	0.22	
v/s Ratio Perm			0.07			0.01			c0.29			c0.44
v/c Ratio	1.32	1.03	0.21	1.09	1.08	0.03	1.16	0.59	0.84	0.39	0.70	1.39
Uniform Delay, d1	54.3	49.0	35.3	58.5	53.3	39.0	70.3	39.8	44.5	71.4	43.9	50.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	151.5	31.2	0.1	59.7	49.4	0.0	123.8	0.4	10.8	4.5	1.1	185.9
Delay (s)	205.8	80.3	35.4	118.3	102.7	39.0	194.1	40.1	55.3	75.9	44.9	235.9
Level of Service	F	F	D	F	F	D	F	D	E	E	D	F
Approach Delay (s)	126.1			107.2			58.9			135.5		
Approach LOS	F			F			E			F		
Intersection Summary												
HCM Average Control Delay	109.9		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.26											
Actuated Cycle Length (s)	146.6				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	99.8%				ICU Level of Service				F			
Analysis Period (min)	15											
c Critical Lane Group												

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	610	1260	70	250	1020	510	30	1050	280	440	1220	460
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)	663	1370	76	272	1109	554	33	1141	304	478	1326	500
RTOR Reduction (vph)	0	0	46	0	0	150	0	0	151	0	0	220
Lane Group Flow (vph)	663	1370	30	272	1109	404	33	1141	153	478	1326	280
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	22.0	39.3	39.3	11.7	29.0	29.0	1.8	39.6	39.6	16.0	53.8	53.8
Effective Green, g (s)	22.0	41.3	41.3	11.7	31.0	31.0	1.8	41.6	41.6	16.0	55.8	55.8
Actuated g/C Ratio	0.17	0.33	0.33	0.09	0.24	0.24	0.01	0.33	0.33	0.13	0.44	0.44
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	597	1659	516	317	1245	388	49	1163	520	434	1560	698
v/s Ratio Prot	c0.19	0.27		0.08	0.22		0.01	c0.32		c0.14	0.37	
v/s Ratio Perm			0.02			c0.25			0.10			0.18
v/c Ratio	1.11	0.83	0.06	0.86	0.89	1.04	0.67	0.98	0.29	1.10	0.85	0.40
Uniform Delay, d1	52.3	39.3	29.3	56.6	46.2	47.8	62.1	42.1	31.6	55.3	31.7	24.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	71.0	3.9	0.1	19.3	8.8	56.6	25.0	21.9	0.6	73.6	5.0	0.7
Delay (s)	123.3	43.2	29.4	75.9	55.0	104.4	87.1	64.1	32.2	128.9	36.6	24.8
Level of Service	F	D	C	E	D	F	F	E	C	F	D	C
Approach Delay (s)		67.9			72.1			58.0			53.2	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM Average Control Delay			62.7			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			126.6			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			92.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	50	0	0	20	100	0	0	0	10	0	10
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)	11	54	0	0	22	109	0	0	0	11	0	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	65	130	0	22								
Volume Left (vph)	11	0	0	11								
Volume Right (vph)	0	109	0	11								
Hadj (s)	0.07	-0.47	0.00	-0.17								
Departure Headway (s)	4.1	3.5	4.3	4.1								
Degree Utilization, x	0.07	0.13	0.00	0.02								
Capacity (veh/h)	858	1002	804	831								
Control Delay (s)	7.5	7.1	7.3	7.2								
Approach Delay (s)	7.5	7.1	0.0	7.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			7.2									
HCM Level of Service			A									
Intersection Capacity Utilization			19.9%	ICU Level of Service	A							
Analysis Period (min)			15									




















HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

												
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	1120	10	0	600	110	0	0	710	0	0	40
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	1217	11	0	652	120	0	0	772	0	0	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.59						0.59	0.59		0.59	0.59	0.59
vC, conflicting volume	772			1228			1978	1995	1223	2707	1940	712
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	612			1228			2663	2691	1223	3902	2599	510
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			100			100	100	0	0	100	87
cM capacity (veh/h)	569			567			8	13	219	0	15	331
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1228	772	772	43								
Volume Left	0	0	0	0								
Volume Right	11	120	772	43								
cSH	1700	1700	219	331								
Volume to Capacity	0.72	0.45	3.53	0.13								
Queue Length 95th (ft)	0	0	Err	11								
Control Delay (s)	0.0	0.0	Err	17.5								
Lane LOS			F	C								
Approach Delay (s)	0.0	0.0	Err	17.5								
Approach LOS			F	C								
Intersection Summary												
Average Delay			2741.3									
Intersection Capacity Utilization			110.2%		ICU Level of Service				H			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

												
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	0.95			1.00	1.00					1.00	
Frt	1.00	1.00			1.00	0.85					0.98	
Flt Protected	0.95	1.00			1.00	1.00					0.96	
Satd. Flow (prot)	1770	3539			1863	1583					1748	
Flt Permitted	0.95	1.00			1.00	1.00					0.96	
Satd. Flow (perm)	1770	3539			1863	1583					1748	
Volume (vph)	140	1690	0	0	700	40	0	0	0	50	0	10
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)	152	1837	0	0	761	43	0	0	0	54	0	11
RTOR Reduction (vph)	0	0	0	0	0	21	0	0	0	0	9	0
Lane Group Flow (vph)	152	1837	0	0	761	22	0	0	0	0	56	0
Turn Type	Prot				Perm				Split			
Protected Phases	5	2			6					4	4	
Permitted Phases						6						
Actuated Green, G (s)	5.9	38.0			28.1	28.1					8.8	
Effective Green, g (s)	5.9	38.0			28.1	28.1					8.8	
Actuated g/C Ratio	0.11	0.69			0.51	0.51					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)	191	2454			955	812					281	
v/s Ratio Prot	0.09	c0.52			0.41						c0.03	
v/s Ratio Perm						0.01						
v/c Ratio	0.80	0.75			0.80	0.03					0.20	
Uniform Delay, d1	23.9	5.4			11.0	6.6					19.9	
Progression Factor	1.00	1.00			1.00	1.00					1.00	
Incremental Delay, d2	20.1	1.3			4.7	0.0					0.3	
Delay (s)	43.9	6.6			15.7	6.6					20.3	
Level of Service	D	A			B	A					C	
Approach Delay (s)		9.5			15.2			0.0			20.3	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM Average Control Delay			11.3				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			54.8				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			58.0%				ICU Level of Service			B		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM



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	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)	510	1370	910	200	220	380
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	554	1489	989	217	239	413
RTOR Reduction (vph)	0	0	0	154	0	307
Lane Group Flow (vph)	554	1489	989	63	239	106
Turn Type	Prot		Perm		Perm	
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	29.0	59.0	26.0	26.0	23.0	23.0
Effective Green, g (s)	29.0	59.0	26.0	26.0	23.0	23.0
Actuated g/C Ratio	0.32	0.66	0.29	0.29	0.26	0.26
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)	570	2320	1022	457	452	405
v/s Ratio Prot	c0.31	0.42	c0.28		c0.14	
v/s Ratio Perm				0.04		0.07
v/c Ratio	0.97	0.64	0.97	0.14	0.53	0.26
Uniform Delay, d1	30.1	9.2	31.6	23.7	28.8	26.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.5	0.6	21.4	0.6	4.4	1.6
Delay (s)	60.6	9.8	53.0	24.3	33.2	28.3
Level of Service	E	A	D	C	C	C
Approach Delay (s)		23.6	47.8		30.1	
Approach LOS		C	D		C	

Intersection Summary

HCM Average Control Delay	32.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			





































HCM Signalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

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	0.95	1.00	1.00	0.95	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	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	240	1180	220	120	860	180	210	310	260	210	290	210
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)	261	1283	239	130	935	196	228	337	283	228	315	228
RTOR Reduction (vph)	0	0	154	0	0	142	0	0	146	0	0	170
Lane Group Flow (vph)	261	1283	85	130	935	54	228	337	137	228	315	58
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	14.0	32.0	32.0	7.0	25.0	25.0	12.0	23.0	23.0	12.0	23.0	23.0
Effective Green, g (s)	14.0	32.0	32.0	7.0	25.0	25.0	12.0	23.0	23.0	12.0	23.0	23.0
Actuated g/C Ratio	0.16	0.36	0.36	0.08	0.28	0.28	0.13	0.26	0.26	0.13	0.26	0.26
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)	275	1258	563	138	983	440	236	476	405	236	476	405
v/s Ratio Prot	c0.15	c0.36		0.07	0.26		c0.13	c0.18		0.13	0.17	
v/s Ratio Perm			0.05			0.03			0.09			0.04
v/c Ratio	0.95	1.02	0.15	0.94	0.95	0.12	0.97	0.71	0.34	0.97	0.66	0.14
Uniform Delay, d1	37.6	29.0	19.7	41.3	31.9	24.3	38.8	30.4	27.3	38.8	30.0	25.9
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	40.1	30.5	0.6	58.8	19.1	0.6	48.6	8.6	2.3	48.6	7.1	0.7
Delay (s)	77.8	59.5	20.3	100.1	51.0	24.9	87.4	39.1	29.6	87.4	37.1	26.6
Level of Service	E	E	C	F	D	C	F	D	C	F	D	C
Approach Delay (s)		56.9			52.0			48.9			48.9	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay			52.8			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			90.0	Sum of lost time (s)			12.0					
Intersection Capacity Utilization			80.5%	ICU Level of Service			D					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	850	740	610	280	370	220	720	1220	380	330	1110	760
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)	924	804	663	304	402	239	783	1326	413	359	1207	826
RTOR Reduction (vph)	0	0	201	0	0	182	0	0	147	0	0	288
Lane Group Flow (vph)	924	804	462	304	402	57	783	1326	266	359	1207	538
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	29.5	46.5	46.5	12.3	29.6	29.6	24.5	46.2	46.2	16.2	37.9	37.9
Effective Green, g (s)	31.0	48.2	48.2	13.8	31.0	31.0	26.0	47.9	47.9	17.7	39.6	39.6
Actuated g/C Ratio	0.22	0.34	0.34	0.10	0.22	0.22	0.18	0.33	0.33	0.12	0.28	0.28
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	741	1707	531	330	1098	342	622	1696	528	423	1402	437
v/s Ratio Prot	c0.27	0.16		0.09	0.08		c0.23	0.26		0.10	0.24	
v/s Ratio Perm			c0.29			0.04			0.17			c0.34
v/c Ratio	1.25	0.47	0.87	0.92	0.37	0.17	1.26	0.78	0.50	0.85	0.86	1.23
Uniform Delay, d1	56.3	37.6	44.7	64.4	47.9	45.8	58.8	43.1	38.3	61.6	49.4	52.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	122.3	0.6	15.8	29.7	0.4	0.5	129.2	2.9	1.8	14.1	6.3	122.4
Delay (s)	178.6	38.2	60.6	94.1	48.4	46.3	188.0	46.0	40.1	75.7	55.7	174.4
Level of Service	F	D	E	F	D	D	F	D	D	E	E	F
Approach Delay (s)		98.7			62.5			89.1			99.7	
Approach LOS		F			E			F			F	
Intersection Summary												
HCM Average Control Delay			91.9	HCM Level of Service				F				
HCM Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			143.6	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			86.7%	ICU Level of Service				E				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM















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
Lane Util. Factor		0.91	1.00		0.95	1.00				0.97		1.00
Frt		1.00	0.85		1.00	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		5085	1583		3539	1583				3433		1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		5085	1583		3539	1583				3433		1583
Volume (vph)	0	780	140	0	270	390	0	0	0	600	0	170
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	848	152	0	293	424	0	0	0	652	0	185
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	125
Lane Group Flow (vph)	0	848	152	0	293	424	0	0	0	652	0	60
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					8		
Permitted Phases			Free			Free						8
Actuated Green, G (s)		24.2	47.5		24.2	47.5				15.3		15.3
Effective Green, g (s)		24.2	47.5		24.2	47.5				15.3		15.3
Actuated g/C Ratio		0.51	1.00		0.51	1.00				0.32		0.32
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		2591	1583		1803	1583				1106		510
v/s Ratio Prot		c0.17			0.08					c0.19		
v/s Ratio Perm			0.10			0.27						0.04
v/c Ratio		0.33	0.10		0.16	0.27				0.59		0.12
Uniform Delay, d1		6.9	0.0		6.2	0.0				13.5		11.3
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.1	0.1		0.2	0.4				0.8		0.1
Delay (s)		6.9	0.1		6.4	0.4				14.3		11.4
Level of Service		A	A		A	A				B		B
Approach Delay (s)		5.9			2.9			0.0			13.7	
Approach LOS		A			A			A			B	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			













HCM Signalized Intersection Capacity Analysis
22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	2000	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0		4.0			
Lane Util. Factor		0.95	1.00		0.91	1.00	0.97		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3539	1583		5085	1583	3433		1667			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3539	1583		5085	1583	3433		1667			
Volume (vph)	0	1120	260	0	560	400	100	0	1480	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)	0	1217	283	0	609	435	109	0	1609	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1217	283	0	609	435	109	0	1609	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		42.4	59.6		42.4	59.6	9.2		59.6			
Effective Green, g (s)		42.4	59.6		42.4	59.6	9.2		59.6			
Actuated g/C Ratio		0.71	1.00		0.71	1.00	0.15		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2518	1583		3618	1583	530		1667			
v/s Ratio Prot		0.34			0.12		0.03					
v/s Ratio Perm			0.18			0.27			c0.97			
v/c Ratio		0.48	0.18		0.17	0.27	0.21		0.97			
Uniform Delay, d1		3.8	0.0		2.8	0.0	22.0		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.7	0.2		0.1	0.4	0.2		15.2			
Delay (s)		4.4	0.2		2.9	0.4	22.2		15.2			
Level of Service		A	A		A	A	C		B			
Approach Delay (s)		3.7			1.9			15.6			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay			8.1				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			59.6				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			41.0%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

												
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	0.91		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	5085		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		5085	1583	1770	5085		1770		1583			
Volume (vph)	0	1400	130	530	370	0	90	0	1000	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)	0	1522	141	576	402	0	98	0	1087	0	0	0
RTOR Reduction (vph)	0	0	91	0	0	0	0	0	567	0	0	0
Lane Group Flow (vph)	0	1522	50	576	402	0	98	0	520	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						8			
Actuated Green, G (s)		31.3	31.3	33.7	68.5		32.5		32.0			
Effective Green, g (s)		32.8	32.8	33.2	70.0		32.0		32.0			
Actuated g/C Ratio		0.30	0.30	0.30	0.64		0.29		0.29			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		4.0			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		3.0			
Lane Grp Cap (vph)		1516	472	534	3236		515		461			
v/s Ratio Prot		c0.30		c0.33	0.08		0.06					
v/s Ratio Perm			0.03						c0.33			
v/c Ratio		1.00	0.11	1.08	0.12		0.19		1.13			
Uniform Delay, d1		38.6	28.0	38.4	7.9		29.3		39.0			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		24.1	0.1	61.8	0.0		0.1		81.6			
Delay (s)		62.7	28.1	100.2	7.9		29.3		120.6			
Level of Service		E	C	F	A		C		F			
Approach Delay (s)		59.7			62.3			113.1			0.0	
Approach LOS		E			E			F			A	
Intersection Summary												
HCM Average Control Delay			76.9			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			95.6%			ICU Level of Service			F			
Analysis Period (min)			15									
c	Critical Lane Group											























HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

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
Lane Util. Factor	1.00	0.91			0.91	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	5085			5085	1583				1770		1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	1770	5085			5085	1583				1770		1583
Volume (vph)	660	1750	0	0	930	40	0	0	0	20	0	50
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)	717	1902	0	0	1011	43	0	0	0	22	0	54
RTOR Reduction (vph)	0	0	0	0	0	30	0	0	0	0	0	50
Lane Group Flow (vph)	717	1902	0	0	1011	13	0	0	0	22	0	4
Turn Type	Prot					Perm				Prot		custom
Protected Phases	5	2			6					8		
Permitted Phases						6						8
Actuated Green, G (s)	32.3	56.9			20.6	20.6				5.2		5.2
Effective Green, g (s)	32.3	56.9			20.6	20.6				5.2		5.2
Actuated g/C Ratio	0.46	0.81			0.29	0.29				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)	816	4127			1494	465				131		117
v/s Ratio Prot	c0.41	0.37			c0.20					c0.01		
v/s Ratio Perm						0.01						0.00
v/c Ratio	0.88	0.46			0.68	0.03				0.17		0.03
Uniform Delay, d1	17.1	2.0			21.8	17.6				30.4		30.1
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	10.6	0.1			1.2	0.0				0.6		0.1
Delay (s)	27.7	2.1			23.0	17.6				31.0		30.2
Level of Service	C	A			C	B				C		C
Approach Delay (s)		9.1			22.8		0.0				30.5	
Approach LOS		A			C		A				C	
Intersection Summary												
HCM Average Control Delay			13.4				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			70.1				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			67.9%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
36: Road "D" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1822		1770	1863	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1822		1770	1863	1583	1770	1723		1770	1863	1583
Volume (vph)	170	60	10	10	70	60	10	10	10	40	10	100
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)	185	65	11	11	76	65	11	11	11	43	11	109
RTOR Reduction (vph)	0	7	0	0	0	46	0	9	0	0	0	85
Lane Group Flow (vph)	185	69	0	11	76	19	11	13	0	43	11	24
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6						8
Actuated Green, G (s)	4.4	16.1		0.5	12.2	12.2	0.5	8.5		1.2	9.2	9.2
Effective Green, g (s)	4.4	16.1		0.5	12.2	12.2	0.5	8.5		1.2	9.2	9.2
Actuated g/C Ratio	0.10	0.38		0.01	0.29	0.29	0.01	0.20		0.03	0.22	0.22
Clearance Time (s)	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
Lane Grp Cap (vph)	184	693		21	537	457	21	346		50	405	344
v/s Ratio Prot	c0.10	c0.04		0.01	c0.04		0.01	0.01		c0.02	0.01	
v/s Ratio Perm						0.01						c0.01
v/c Ratio	1.01	0.10		0.52	0.14	0.04	0.52	0.04		0.86	0.03	0.07
Uniform Delay, d1	18.9	8.4		20.8	11.2	10.8	20.8	13.6		20.5	13.0	13.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	67.8	0.1		21.6	0.1	0.0	21.6	0.0		76.1	0.0	0.1
Delay (s)	86.7	8.5		42.4	11.3	10.9	42.4	13.7		96.6	13.1	13.2
Level of Service	F	A		D	B	B	D	B		F	B	B
Approach Delay (s)		63.9			13.4			23.2			35.2	
Approach LOS		E			B			C			D	
Intersection Summary												
HCM Average Control Delay			41.4				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.21									
Actuated Cycle Length (s)			42.3				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			31.6%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

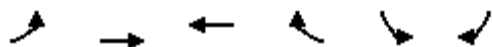
HCM Unsignalized Intersection Capacity Analysis
37: Road "J" & Road "A"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	40	70	80	30	70	140
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	76	87	33	76	152
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			120		250	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			120		250	43
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		89	85
cM capacity (veh/h)			1468		695	1027
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	43	76	87	33	76	152
Volume Left	0	0	87	0	76	0
Volume Right	0	76	0	0	0	152
cSH	1700	1700	1468	1700	695	1027
Volume to Capacity	0.03	0.04	0.06	0.02	0.11	0.15
Queue Length 95th (ft)	0	0	5	0	9	13
Control Delay (s)	0.0	0.0	7.6	0.0	10.8	9.1
Lane LOS			A		B	A
Approach Delay (s)	0.0		5.5		9.7	
Approach LOS					A	
Intersection Summary						
Average Delay			6.1			
Intersection Capacity Utilization			21.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
38: Road "J" & Road "L"

























Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	150	30	20	60	50	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	163	33	22	65	54	98
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)			1193			
pX, platoon unblocked						
vC, conflicting volume	87				380	22
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87				380	22
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				90	91
cM capacity (veh/h)	1509				555	1055
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	163	33	22	65	54	98
Volume Left	163	0	0	0	54	0
Volume Right	0	0	0	65	0	98
cSH	1509	1700	1700	1700	555	1055
Volume to Capacity	0.11	0.02	0.01	0.04	0.10	0.09
Queue Length 95th (ft)	9	0	0	0	8	8
Control Delay (s)	7.7	0.0	0.0	0.0	12.2	8.8
Lane LOS	A				B	A
Approach Delay (s)	6.4		0.0		10.0	
Approach LOS					A	
Intersection Summary						
Average Delay			6.4			
Intersection Capacity Utilization			25.0%		ICU Level of Service	A
Analysis Period (min)			15			























HCM Signalized Intersection Capacity Analysis
39: Road "J" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1723	
Volume (vph)	10	40	20	90	40	20	30	10	140	20	10	10
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)	11	43	22	98	43	22	33	11	152	22	11	11
RTOR Reduction (vph)	0	0	20	0	0	18	0	0	104	0	7	0
Lane Group Flow (vph)	11	43	2	98	43	4	33	11	48	22	15	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	1.2	8.6	8.6	8.4	15.8	15.8	27.1	28.1	28.1	27.1	28.1	
Effective Green, g (s)	1.2	8.6	8.6	8.4	15.8	15.8	27.1	28.1	28.1	27.1	28.1	
Actuated g/C Ratio	0.01	0.10	0.10	0.10	0.18	0.18	0.31	0.32	0.32	0.31	0.32	
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)	24	182	154	169	334	284	544	594	504	544	549	
v/s Ratio Prot	0.01	c0.02		c0.06	0.02		c0.02	0.01		0.01	0.01	
v/s Ratio Perm			0.00			0.00			c0.03			
v/c Ratio	0.46	0.24	0.01	0.58	0.13	0.01	0.06	0.02	0.10	0.04	0.03	
Uniform Delay, d1	43.2	36.8	36.0	38.2	30.4	29.8	21.6	20.6	21.1	21.4	20.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.2	0.7	0.0	4.8	0.2	0.0	0.2	0.1	0.4	0.1	0.1	
Delay (s)	56.4	37.4	36.0	43.0	30.6	29.8	21.8	20.7	21.5	21.6	20.7	
Level of Service	E	D	D	D	C	C	C	C	C	C	C	
Approach Delay (s)		39.8			37.9			21.5			21.2	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM Average Control Delay			30.0				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.16									
Actuated Cycle Length (s)			88.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			26.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c	Critical Lane Group											















HCM Signalized Intersection Capacity Analysis
40: Road "J" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	1853		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	1853		1770	1863	1583
Volume (vph)	40	10	40	10	10	10	50	280	10	10	180	40
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)	43	11	43	11	11	11	54	304	11	11	196	43
RTOR Reduction (vph)	0	0	26	0	7	0	0	2	0	0	0	30
Lane Group Flow (vph)	43	11	17	11	15	0	54	313	0	11	196	13
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	2.2	26.3	26.3	0.7	24.8		2.2	21.2		0.7	19.7	19.7
Effective Green, g (s)	2.2	26.3	26.3	0.7	24.8		2.2	21.2		0.7	19.7	19.7
Actuated g/C Ratio	0.03	0.41	0.41	0.01	0.38		0.03	0.33		0.01	0.30	0.30
Clearance Time (s)	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
Lane Grp Cap (vph)	60	755	641	19	658		60	605		19	566	481
v/s Ratio Prot	c0.02	0.01		0.01	0.01		c0.03	c0.17		0.01	0.11	
v/s Ratio Perm			c0.01									0.01
v/c Ratio	0.72	0.01	0.03	0.58	0.02		0.90	0.52		0.58	0.35	0.03
Uniform Delay, d1	31.0	11.5	11.6	32.0	12.5		31.2	17.7		32.0	17.6	15.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	33.3	0.0	0.1	36.3	0.1		81.0	3.1		36.3	1.7	0.1
Delay (s)	64.4	11.6	11.7	68.2	12.6		112.2	20.8		68.2	19.3	16.0
Level of Service	E	B	B	E	B		F	C		E	B	B
Approach Delay (s)		35.0			31.1			34.2			20.9	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM Average Control Delay			29.7			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.27									
Actuated Cycle Length (s)			64.9			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			37.6%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
41: Road "G" & Road "A"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	110	20	490	190	30	310
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	22	533	207	33	337
RTOR Reduction (vph)	0	18	0	84	0	0
Lane Group Flow (vph)	120	4	533	123	33	337
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	11.8	11.8	38.3	38.3	2.4	44.7
Effective Green, g (s)	11.8	11.8	38.3	38.3	2.4	44.7
Actuated g/C Ratio	0.18	0.18	0.59	0.59	0.04	0.69
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)	324	290	2101	940	66	2453
v/s Ratio Prot	c0.07		c0.15		c0.02	0.10
v/s Ratio Perm		0.00		0.08		
v/c Ratio	0.37	0.01	0.25	0.13	0.50	0.14
Uniform Delay, d1	23.1	21.6	6.3	5.8	30.5	3.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.0	0.3	0.3	5.8	0.1
Delay (s)	23.8	21.6	6.6	6.1	36.3	3.5
Level of Service	C	C	A	A	D	A
Approach Delay (s)	23.5		6.4			6.4
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			8.3		HCM Level of Service	A
HCM Volume to Capacity ratio			0.29			
Actuated Cycle Length (s)			64.5		Sum of lost time (s)	12.0
Intersection Capacity Utilization			33.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						























HCM Signalized Intersection Capacity Analysis
42: Road "G" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1792		1770	1815		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1792		1770	1815		1770	3539	1583	1770	3539	1583
Volume (vph)	30	60	20	70	50	10	40	130	130	10	70	20
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)	33	65	22	76	54	11	43	141	141	11	76	22
RTOR Reduction (vph)	0	14	0	0	7	0	0	0	102	0	0	16
Lane Group Flow (vph)	33	73	0	76	58	0	43	141	39	11	76	6
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases									2			6
Actuated Green, G (s)	1.6	24.7		3.1	26.2		4.0	18.0	18.0	4.0	18.0	18.0
Effective Green, g (s)	1.6	24.7		3.1	26.2		4.0	18.0	18.0	4.0	18.0	18.0
Actuated g/C Ratio	0.02	0.38		0.05	0.40		0.06	0.27	0.27	0.06	0.27	0.27
Clearance Time (s)	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
Lane Grp Cap (vph)	43	673		83	723		108	968	433	108	968	433
v/s Ratio Prot	0.02	c0.04		c0.04	0.03		c0.02	c0.04		0.01	0.02	
v/s Ratio Perm									0.02			0.00
v/c Ratio	0.77	0.11		0.92	0.08		0.40	0.15	0.09	0.10	0.08	0.01
Uniform Delay, d1	31.9	13.4		31.2	12.3		29.7	18.1	17.8	29.2	17.7	17.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	56.1	0.3		70.5	0.2		2.4	0.3	0.4	0.4	0.2	0.1
Delay (s)	88.0	13.7		101.7	12.5		32.1	18.4	18.2	29.6	17.9	17.5
Level of Service	F	B		F	B		C	B	B	C	B	B
Approach Delay (s)		34.1			60.6			20.1			19.0	
Approach LOS		C			E			C			B	
Intersection Summary												
HCM Average Control Delay			30.6				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.20									
Actuated Cycle Length (s)			65.8				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			26.1%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												



















HCM Signalized Intersection Capacity Analysis
43: Road "G" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1793		1770	1723		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1793		1770	1723		1770	1863	1583	1770	1863	1583
Volume (vph)	10	30	10	240	30	30	10	310	290	30	190	10
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)	11	33	11	261	33	33	11	337	315	33	207	11
RTOR Reduction (vph)	0	10	0	0	24	0	0	0	205	0	0	7
Lane Group Flow (vph)	11	34	0	261	42	0	11	337	110	33	207	4
Turn Type	Prot		Prot			Prot		Perm		Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	0.6	5.5		9.3	14.2		4.2	18.7	18.7	4.2	18.7	18.7
Effective Green, g (s)	0.6	5.5		9.3	14.2		4.2	18.7	18.7	4.2	18.7	18.7
Actuated g/C Ratio	0.01	0.10		0.17	0.26		0.08	0.35	0.35	0.08	0.35	0.35
Clearance Time (s)	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
Lane Grp Cap (vph)	20	184		307	456		138	649	551	138	649	551
v/s Ratio Prot	0.01	c0.02		c0.15	0.02		0.01	c0.18		c0.02	0.11	
v/s Ratio Perm									0.07			0.00
v/c Ratio	0.55	0.19		0.85	0.09		0.08	0.52	0.20	0.24	0.32	0.01
Uniform Delay, d1	26.4	22.1		21.5	14.9		23.0	13.9	12.3	23.2	12.8	11.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.9	0.5		19.6	0.1		1.1	3.0	0.8	4.1	1.3	0.0
Delay (s)	55.3	22.5		41.1	15.0		24.1	16.9	13.1	27.3	14.1	11.5
Level of Service	E	C		D	B		C	B	B	C	B	B
Approach Delay (s)		29.1			35.8			15.2			15.7	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM Average Control Delay			21.1			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			53.7			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			49.6%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
44: Road "G" & Road "D"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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			0.95	
Frt	1.00		0.85				1.00	1.00			0.99	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1770		1583				1770	1863			3491	
Flt Permitted	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (perm)	1770		1583				1770	1863			3491	
Volume (vph)	10	0	30	0	0	0	40	120	0	0	100	10
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)	11	0	33	0	0	0	43	130	0	0	109	11
RTOR Reduction (vph)	0	0	28	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	11	0	5	0	0	0	43	130	0	0	115	0
Turn Type	Prot		custom				Prot					
Protected Phases	4						5	2			6	
Permitted Phases			4									
Actuated Green, G (s)	7.8		7.8				1.9	31.8			25.9	
Effective Green, g (s)	7.8		7.8				1.9	31.8			25.9	
Actuated g/C Ratio	0.16		0.16				0.04	0.67			0.54	
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)	290		259				71	1245			1900	
v/s Ratio Prot	c0.01						c0.02	c0.07			0.03	
v/s Ratio Perm			0.00									
v/c Ratio	0.04		0.02				0.61	0.10			0.06	
Uniform Delay, d1	16.7		16.7				22.5	2.8			5.1	
Progression Factor	1.00		1.00				1.00	1.00			1.00	
Incremental Delay, d2	0.1		0.0				13.7	0.2			0.1	
Delay (s)	16.8		16.7				36.2	3.0			5.2	
Level of Service	B		B				D	A			A	
Approach Delay (s)		16.7			0.0			11.2			5.2	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM Average Control Delay			9.8				HCM Level of Service				A	
HCM Volume to Capacity ratio			0.11									
Actuated Cycle Length (s)			47.6				Sum of lost time (s)				8.0	
Intersection Capacity Utilization			18.9%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												





































HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Volume (vph)	70	100	10	10	20	160	10	10	10	730	10	20
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)	76	109	11	11	22	174	11	11	11	793	11	22
RTOR Reduction (vph)	0	0	10	0	0	158	0	10	0	0	0	17
Lane Group Flow (vph)	76	109	1	11	22	16	11	12	0	793	11	5
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6						8
Actuated Green, G (s)	9.2	10.9	10.9	6.5	8.2	8.2	35.2	4.3		50.5	19.6	19.6
Effective Green, g (s)	9.2	10.9	10.9	6.5	8.2	8.2	35.2	4.3		50.5	19.6	19.6
Actuated g/C Ratio	0.10	0.12	0.12	0.07	0.09	0.09	0.40	0.05		0.57	0.22	0.22
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)	185	437	196	130	329	147	706	84		1013	414	352
v/s Ratio Prot	c0.04	c0.03		0.01	0.01		0.01	c0.01		c0.45	0.01	
v/s Ratio Perm			0.00			0.01						0.00
v/c Ratio	0.41	0.25	0.01	0.08	0.07	0.11	0.02	0.14		0.78	0.03	0.01
Uniform Delay, d1	37.0	35.0	33.9	38.1	36.5	36.7	16.0	40.2		14.6	26.8	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	0.3	0.0	0.3	0.1	0.3	0.0	0.7		4.0	0.0	0.0
Delay (s)	38.4	35.3	33.9	38.4	36.6	37.0	16.0	40.9		18.6	26.9	26.8
Level of Service	D	D	C	D	D	D	B	D		B	C	C
Approach Delay (s)		36.4			37.0			32.6			18.9	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay			25.0				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			88.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			64.3%				ICU Level of Service			C		
Analysis Period (min)			15									
c	Critical Lane Group											







































HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	0.88	0.94	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	2787	4990	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	2787	4990	3539	1583
Volume (vph)	10	1080	50	450	310	1070	20	70	570	1190	50	10
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)	11	1174	54	489	337	1163	22	76	620	1293	54	11
RTOR Reduction (vph)	0	0	27	0	0	454	0	0	559	0	0	7
Lane Group Flow (vph)	11	1174	27	489	337	709	22	76	61	1293	54	4
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	2.1	48.4	48.4	25.1	71.4	71.4	2.4	14.2	14.2	41.3	53.1	53.1
Effective Green, g (s)	2.1	48.4	48.4	25.1	71.4	71.4	2.4	14.2	14.2	41.3	53.1	53.1
Actuated g/C Ratio	0.01	0.33	0.33	0.17	0.49	0.49	0.02	0.10	0.10	0.28	0.37	0.37
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)	50	1697	528	594	2504	779	57	347	273	1421	1296	580
v/s Ratio Prot	0.00	0.23		c0.14	0.07		0.01	0.02		c0.26	0.02	
v/s Ratio Perm			0.02			c0.45			c0.02			0.00
v/c Ratio	0.22	0.69	0.05	0.82	0.13	0.91	0.39	0.22	0.22	0.91	0.04	0.01
Uniform Delay, d1	70.6	41.8	32.7	57.8	20.0	33.8	70.6	60.3	60.3	50.1	29.6	29.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	2.3	0.2	9.0	0.1	16.6	4.3	0.3	0.4	8.8	0.0	0.0
Delay (s)	72.9	44.2	32.9	66.8	20.1	50.4	74.9	60.6	60.7	58.9	29.6	29.2
Level of Service	E	D	C	E	C	D	E	E	E	E	C	C
Approach Delay (s)		43.9			49.3			61.1			57.5	
Approach LOS		D			D			E			E	
Intersection Summary												
HCM Average Control Delay			51.7			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			145.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			82.9%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"































Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	0.94	0.91	1.00	0.97	0.91	0.88	0.94	0.95	1.00	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5085	1583	3433	5085	2787	4990	3539	1583	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5085	1583	3433	5085	2787	4990	3539	1583	3433	5085	2787
Volume (vph)	830	1550	390	160	1030	200	530	250	330	310	120	700
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)	902	1685	424	174	1120	217	576	272	359	337	130	761
RTOR Reduction (vph)	0	0	166	0	0	128	0	0	107	0	0	583
Lane Group Flow (vph)	902	1685	258	174	1120	89	576	272	252	337	130	178
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	29.0	69.1	69.1	11.5	51.6	51.6	18.6	26.9	26.9	16.5	24.8	24.8
Effective Green, g (s)	29.0	69.1	69.1	11.5	51.6	51.6	18.6	26.9	26.9	16.5	24.8	24.8
Actuated g/C Ratio	0.21	0.49	0.49	0.08	0.37	0.37	0.13	0.19	0.19	0.12	0.18	0.18
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)	1034	2510	781	282	1874	1027	663	680	304	405	901	494
v/s Ratio Prot	c0.18	c0.33		0.05	c0.22		c0.12	0.08		0.10	0.03	
v/s Ratio Perm			0.16			0.03			c0.16			0.06
v/c Ratio	0.87	0.67	0.33	0.62	0.60	0.09	0.87	0.40	0.83	0.83	0.14	0.36
Uniform Delay, d1	53.7	26.8	21.4	62.1	35.8	28.8	59.5	49.5	54.4	60.4	48.6	50.6
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	8.2	1.5	1.1	4.0	1.4	0.2	11.6	0.4	17.2	13.6	0.1	0.5
Delay (s)	61.9	28.3	22.6	66.1	37.2	29.0	71.2	49.9	71.6	74.0	48.7	51.1
Level of Service	E	C	C	E	D	C	E	D	E	E	D	D
Approach Delay (s)		37.6			39.4			66.5			57.1	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM Average Control Delay	46.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			






















HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	650	1070	90	80	860	120	100	70	60	100	70	370
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)	707	1163	98	87	935	130	109	76	65	109	76	402
RTOR Reduction (vph)	0	0	46	0	0	82	0	0	57	0	0	313
Lane Group Flow (vph)	707	1163	52	87	935	48	109	76	8	109	76	89
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	24.3	53.4	53.4	8.1	37.2	37.2	8.1	12.2	12.2	10.2	14.3	14.3
Effective Green, g (s)	24.3	53.4	53.4	8.1	37.2	37.2	8.1	12.2	12.2	10.2	14.3	14.3
Actuated g/C Ratio	0.24	0.53	0.53	0.08	0.37	0.37	0.08	0.12	0.12	0.10	0.14	0.14
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)	835	2718	846	144	1894	589	144	228	193	181	267	227
v/s Ratio Prot	c0.21	0.23		0.05	c0.18		c0.06	0.04		0.06	0.04	
v/s Ratio Perm			0.03			0.03			0.01			c0.06
v/c Ratio	0.85	0.43	0.06	0.60	0.49	0.08	0.76	0.33	0.04	0.60	0.28	0.39
Uniform Delay, d1	36.0	14.0	11.2	44.4	24.1	20.3	44.9	40.1	38.7	42.9	38.2	38.9
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	7.9	0.5	0.1	7.0	0.9	0.3	20.1	0.9	0.1	5.5	0.6	1.1
Delay (s)	44.0	14.5	11.3	51.3	25.0	20.6	65.0	41.0	38.8	48.5	38.8	40.0
Level of Service	D	B	B	D	C	C	E	D	D	D	D	D
Approach Delay (s)		24.9			26.5			50.9			41.4	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM Average Control Delay			29.5				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			99.9				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			57.4%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												



















HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

													
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	
Lane Util. Factor	1.00	0.95			0.95	1.00				0.97	1.00	1.00	
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85	
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00	
Satd. Flow (prot)	1770	3539			3539	1583				3433	1583	1583	
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00	
Satd. Flow (perm)	1770	3539			3539	1583				3433	1583	1583	
Volume (vph)	10	1020	0	0	860	210	0	0	0	230	0	10	
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)	11	1109	0	0	935	228	0	0	0	250	0	11	
RTOR Reduction (vph)	0	0	0	0	0	96	0	0	0	0	0	8	
Lane Group Flow (vph)	11	1109	0	0	935	132	0	0	0	250	0	3	
Turn Type	Prot			Perm						Prot		custom	
Protected Phases	5	2			6					4			
Permitted Phases					6							4	
Actuated Green, G (s)	0.8	47.2			42.4	42.4				18.0		18.0	
Effective Green, g (s)	0.8	47.2			42.4	42.4				18.0		18.0	
Actuated g/C Ratio	0.01	0.64			0.58	0.58				0.25		0.25	
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)	19	2282			2050	917				844		389	
v/s Ratio Prot	0.01	c0.31			0.26					c0.07			
v/s Ratio Perm						0.08						0.00	
v/c Ratio	0.58	0.49			0.46	0.14				0.30		0.01	
Uniform Delay, d1	36.0	6.7			8.8	7.1				22.4		20.8	
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00	
Incremental Delay, d2	36.3	0.7			0.7	0.3				0.9		0.0	
Delay (s)	72.3	7.5			9.5	7.4				23.3		20.9	
Level of Service	E	A			A	A				C		C	
Approach Delay (s)		8.1			9.1			0.0			23.2		
Approach LOS		A			A			A			C		
Intersection Summary													
HCM Average Control Delay			10.1		HCM Level of Service					B			
HCM Volume to Capacity ratio			0.43										
Actuated Cycle Length (s)			73.2		Sum of lost time (s)					8.0			
Intersection Capacity Utilization			41.4%		ICU Level of Service					A			
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
57: Road "Q" & Road "S"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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
Lane Util. Factor	1.00	1.00			1.00	1.00				1.00		1.00
Frt	1.00	1.00			1.00	0.85				1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)	1770	1863			1863	1583				1770		1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	1770	1863			1863	1583				1770		1583
Volume (vph)	10	10	0	0	10	10	0	0	0	10	0	10
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)	11	11	0	0	11	11	0	0	0	11	0	11
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	0	0	0	8
Lane Group Flow (vph)	11	11	0	0	11	3	0	0	0	11	0	3
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				4			
Permitted Phases					6							4
Actuated Green, G (s)	0.7	12.5			7.8	7.8				6.4		6.4
Effective Green, g (s)	0.7	12.5			7.8	7.8				6.4		6.4
Actuated g/C Ratio	0.03	0.46			0.29	0.29				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)	46	866			540	459				421		377
v/s Ratio Prot	c0.01	0.01			c0.01				c0.01			
v/s Ratio Perm						0.00						0.00
v/c Ratio	0.24	0.01			0.02	0.01				0.03		0.01
Uniform Delay, d1	12.8	3.9			6.8	6.8				7.9		7.8
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	2.7	0.0			0.0	0.0				0.0		0.0
Delay (s)	15.5	3.9			6.8	6.8				7.9		7.8
Level of Service	B	A			A	A				A		A
Approach Delay (s)		9.7			6.8			0.0			7.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			8.1		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.03									
Actuated Cycle Length (s)			26.9		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			17.2%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
58: Road "B" North & Road "A"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

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
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
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	1863	1583	1770	1863	1583
Volume (vph)	100	10	10	10	10	10	10	190	10	10	30	60
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)	109	11	11	11	11	11	11	207	11	11	33	65
RTOR Reduction (vph)	0	0	9	0	10	0	0	0	5	0	0	31
Lane Group Flow (vph)	109	11	2	11	12	0	11	207	6	11	33	34
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	7.9	11.2	11.2	0.7	4.0		0.7	31.1	31.1	0.7	31.1	31.1
Effective Green, g (s)	7.9	11.2	11.2	0.7	4.0		0.7	31.1	31.1	0.7	31.1	31.1
Actuated g/C Ratio	0.13	0.19	0.19	0.01	0.07		0.01	0.52	0.52	0.01	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
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)	234	350	297	21	115		21	971	825	21	971	825
v/s Ratio Prot	c0.06	0.01		0.01	c0.01		c0.01	c0.11		0.01	0.02	
v/s Ratio Perm			0.00						0.00			0.02
v/c Ratio	0.47	0.03	0.01	0.52	0.10		0.52	0.21	0.01	0.52	0.03	0.04
Uniform Delay, d1	23.9	19.8	19.7	29.3	26.2		29.3	7.7	6.9	29.3	7.0	7.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.0	0.0	21.6	0.4		21.6	0.1	0.0	21.6	0.0	0.0
Delay (s)	25.4	19.9	19.7	50.9	26.6		50.9	7.8	6.9	50.9	7.0	7.0
Level of Service	C	B	B	D	C		D	A	A	D	A	A
Approach Delay (s)		24.5			34.7			9.8			11.4	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM Average Control Delay			15.6			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			59.7			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			28.9%			ICU Level of Service		A				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 59: Road "B" South & Road "A"

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM

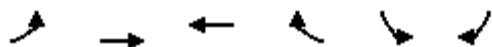
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	210	10	10	10	10	40	10	10	10	40	10	50
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)	228	11	11	11	11	43	11	11	11	43	11	54
RTOR Reduction (vph)	0	0	8	0	0	39	0	0	8	0	0	39
Lane Group Flow (vph)	228	11	3	11	11	4	11	11	3	43	11	15
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	16.4	23.3	23.3	1.1	8.0	8.0	26.8	26.8	26.8	26.8	26.8	26.8
Effective Green, g (s)	16.4	23.3	23.3	1.1	8.0	8.0	26.8	26.8	26.8	26.8	26.8	26.8
Actuated g/C Ratio	0.17	0.25	0.25	0.01	0.09	0.09	0.29	0.29	0.29	0.29	0.29	0.29
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)	309	462	392	21	159	135	505	531	451	505	531	451
v/s Ratio Prot	c0.13	0.01		0.01	c0.01		0.01	0.01		c0.02	0.01	
v/s Ratio Perm			0.00			0.00			0.00			c0.01
v/c Ratio	0.74	0.02	0.01	0.52	0.07	0.03	0.02	0.02	0.01	0.09	0.02	0.03
Uniform Delay, d1	36.8	26.7	26.6	46.2	39.6	39.4	24.2	24.2	24.1	24.6	24.2	24.3
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	8.9	0.0	0.0	21.6	0.2	0.1	0.1	0.1	0.0	0.3	0.1	0.1
Delay (s)	45.6	26.8	26.6	67.8	39.8	39.5	24.2	24.2	24.1	24.9	24.2	24.4
Level of Service	D	C	C	E	D	D	C	C	C	C	C	C
Approach Delay (s)		44.0			44.3			24.2			24.6	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	94.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 60: Road "B" North & Pacific Avenue

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 No PP PM





















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	30	10	10	10	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	11	11	11	11	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	11				92	16
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	11				92	16
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	99
cM capacity (veh/h)	1608				889	1063

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	33	11	22	11	11
Volume Left	33	0	0	11	0
Volume Right	0	0	11	0	11
cSH	1608	1700	1700	889	1063
Volume to Capacity	0.02	0.01	0.01	0.01	0.01
Queue Length 95th (ft)	2	0	0	1	1
Control Delay (s)	7.3	0.0	0.0	9.1	8.4
Lane LOS	A			A	A
Approach Delay (s)	5.5		0.0	8.8	
Approach LOS				A	

Intersection Summary					
Average Delay			4.9		
Intersection Capacity Utilization		18.3%		ICU Level of Service	A
Analysis Period (min)		15			

HCM Signalized Intersection Capacity Analysis
61: Road "B" North & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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		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	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		1583				1770	1863			1863	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		1583				1770	1863			1863	1583
Volume (vph)	10	0	10	0	0	0	10	50	0	0	40	10
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)	11	0	11	0	0	0	11	54	0	0	43	11
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	11	0	1	0	0	0	11	54	0	0	43	9
Turn Type	Prot		custom				Prot					Perm
Protected Phases	4						5	2			6	
Permitted Phases			4									6
Actuated Green, G (s)	6.2		6.2				1.4	74.0			68.6	68.6
Effective Green, g (s)	6.2		6.2				1.4	74.0			68.6	68.6
Actuated g/C Ratio	0.07		0.07				0.02	0.84			0.78	0.78
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)	124		111				28	1563			1449	1231
v/s Ratio Prot	c0.01						c0.01	c0.03			0.02	
v/s Ratio Perm			0.00									0.01
v/c Ratio	0.09		0.01				0.39	0.03			0.03	0.01
Uniform Delay, d1	38.4		38.1				43.0	1.2			2.2	2.2
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.3		0.0				8.9	0.0			0.0	0.0
Delay (s)	38.7		38.2				51.8	1.2			2.2	2.2
Level of Service	D		D				D	A			A	A
Approach Delay (s)		38.4			0.0			9.8			2.2	
Approach LOS		D			A			A			A	
Intersection Summary												
HCM Average Control Delay			11.3				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.04									
Actuated Cycle Length (s)			88.2				Sum of lost time (s)				8.0	
Intersection Capacity Utilization			17.2%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
62: Road "B" South & Road "C"

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

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		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	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770		1583				1770	1863			1863	1583
Flt Permitted	0.95		1.00				0.95	1.00			1.00	1.00
Satd. Flow (perm)	1770		1583				1770	1863			1863	1583
Volume (vph)	50	0	10	0	0	0	10	10	0	0	10	40
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)	54	0	11	0	0	0	11	11	0	0	11	43
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	0	0	0	13
Lane Group Flow (vph)	54	0	1	0	0	0	11	11	0	0	11	30
Turn Type	Prot		custom				Prot					Perm
Protected Phases	4						5	2			6	
Permitted Phases			4									6
Actuated Green, G (s)	8.9		8.9				1.2	56.2			51.0	51.0
Effective Green, g (s)	8.9		8.9				1.2	56.2			51.0	51.0
Actuated g/C Ratio	0.12		0.12				0.02	0.77			0.70	0.70
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)	215		193				29	1432			1300	1104
v/s Ratio Prot	c0.03						c0.01	0.01			0.01	
v/s Ratio Perm			0.00									c0.02
v/c Ratio	0.25		0.01				0.38	0.01			0.01	0.03
Uniform Delay, d1	29.1		28.2				35.6	2.0			3.4	3.4
Progression Factor	1.00		1.00				1.00	1.00			1.00	1.00
Incremental Delay, d2	0.6		0.0				8.1	0.0			0.0	0.0
Delay (s)	29.7		28.2				43.7	2.0			3.4	3.4
Level of Service	C		C				D	A			A	A
Approach Delay (s)		29.4			0.0			22.8			3.4	
Approach LOS		C			A			C			A	
Intersection Summary												
HCM Average Control Delay			18.4				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.07									
Actuated Cycle Length (s)			73.1				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			17.2%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											













HCM Signalized Intersection Capacity Analysis
64: Elverta Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

													
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	
Lane Util. Factor		0.95	1.00		1.00	1.00				1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (prot)		3539	1583		1863	1583				1770	1583	1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (perm)		3539	1583		1863	1583				1770	1583	1583	
Volume (vph)	0	480	330	0	190	500	0	0	0	300	0	130	
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	522	359	0	207	543	0	0	0	326	0	141	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	101	
Lane Group Flow (vph)	0	522	359	0	207	543	0	0	0	326	0	40	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		25.6	46.8		25.6	46.8				13.2		13.2	
Effective Green, g (s)		25.6	46.8		25.6	46.8				13.2		13.2	
Actuated g/C Ratio		0.55	1.00		0.55	1.00				0.28		0.28	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		1936	1583		1019	1583				499		446	
v/s Ratio Prot		0.15			0.11					c0.18			
v/s Ratio Perm			0.23			c0.34						0.03	
v/c Ratio		0.27	0.23		0.20	0.34				0.65		0.09	
Uniform Delay, d1		5.6	0.0		5.4	0.0				14.8		12.4	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.1	0.3		0.4	0.6				3.1		0.1	
Delay (s)		5.7	0.3		5.9	0.6				17.9		12.5	
Level of Service		A	A		A	A				B		B	
Approach Delay (s)		3.5			2.0			0.0			16.2		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			5.8									HCM Level of Service	A
HCM Volume to Capacity ratio			0.44										
Actuated Cycle Length (s)			46.8									Sum of lost time (s)	4.0
Intersection Capacity Utilization			36.6%									ICU Level of Service	A
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
65: Elverta Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM

												
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	1.00		0.95	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		3539	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		3539	1583	1770		1583			
Volume (vph)	0	390	390	0	610	200	80	0	760	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)	0	424	424	0	663	217	87	0	826	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	424	424	0	663	217	87	0	826	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		52.9	70.2		52.9	70.2	9.3		70.2			
Effective Green, g (s)		52.9	70.2		52.9	70.2	9.3		70.2			
Actuated g/C Ratio		0.75	1.00		0.75	1.00	0.13		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1404	1583		2667	1583	234		1583			
v/s Ratio Prot		0.23			0.19		0.05					
v/s Ratio Perm			0.27			0.14			c0.52			
v/c Ratio		0.30	0.27		0.25	0.14	0.37		0.52			
Uniform Delay, d1		2.8	0.0		2.6	0.0	27.8		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.6	0.4		0.0	0.2	1.0		1.2			
Delay (s)		3.3	0.4		2.7	0.2	28.8		1.2			
Level of Service		A	A		A	A	C		A			
Approach Delay (s)		1.9			2.1			3.9			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			2.6				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			70.2				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			31.6%				ICU Level of Service		A			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
66: Sankey Rd & Road "C"

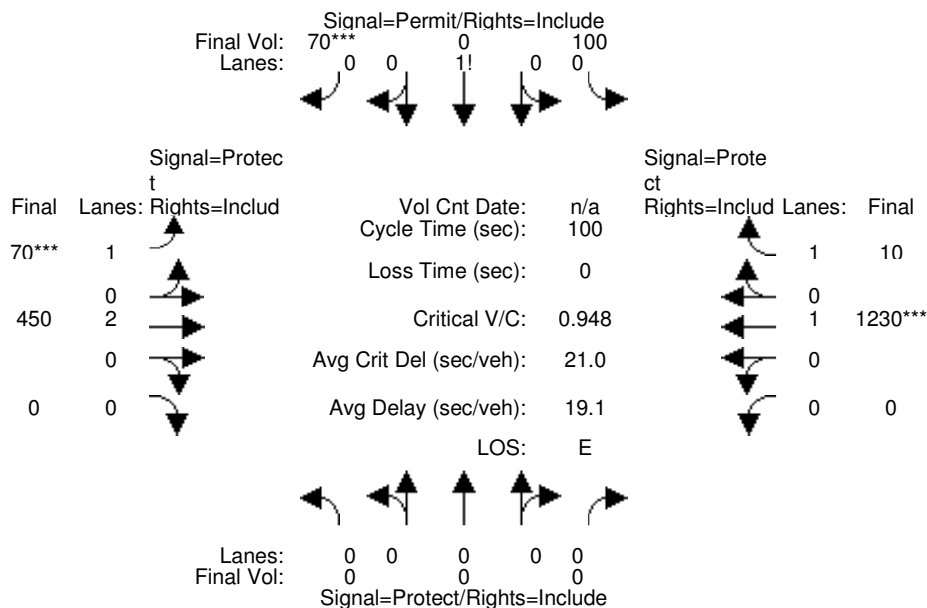
Sutter Pointe EIR
Cumulative Plus Project Phase 1 No PP PM



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
Lane Util. Factor	1.00	1.00			1.00	1.00				1.00		1.00
Frt	1.00	1.00			1.00	0.85				1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)	1770	1863			1863	1583				1770		1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	1770	1863			1863	1583				1770		1583
Volume (vph)	40	20	0	0	10	10	0	0	0	10	0	20
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)	43	22	0	0	11	11	0	0	0	11	0	22
RTOR Reduction (vph)	0	0	0	0	0	5	0	0	0	0	0	20
Lane Group Flow (vph)	43	22	0	0	11	6	0	0	0	11	0	2
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				4			
Permitted Phases					6							4
Actuated Green, G (s)	2.1	33.4			27.3	27.3				5.1		5.1
Effective Green, g (s)	2.1	33.4			27.3	27.3				5.1		5.1
Actuated g/C Ratio	0.05	0.72			0.59	0.59				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)	80	1338			1094	929				194		174
v/s Ratio Prot	c0.02	c0.01			0.01				c0.01			
v/s Ratio Perm					0.00							0.00
v/c Ratio	0.54	0.02			0.01	0.01				0.06		0.01
Uniform Delay, d1	21.7	1.9			4.0	4.0				18.5		18.5
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	6.8	0.0			0.0	0.0				0.6		0.1
Delay (s)	28.5	1.9			4.0	4.0				19.1		18.6
Level of Service	C	A			A	A				B		B
Approach Delay (s)		19.5			4.0				0.0		18.8	
Approach LOS		B			A				A		B	
Intersection Summary												
HCM Average Control Delay			16.5		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.05									
Actuated Cycle Length (s)			46.5		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			18.9%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 AM

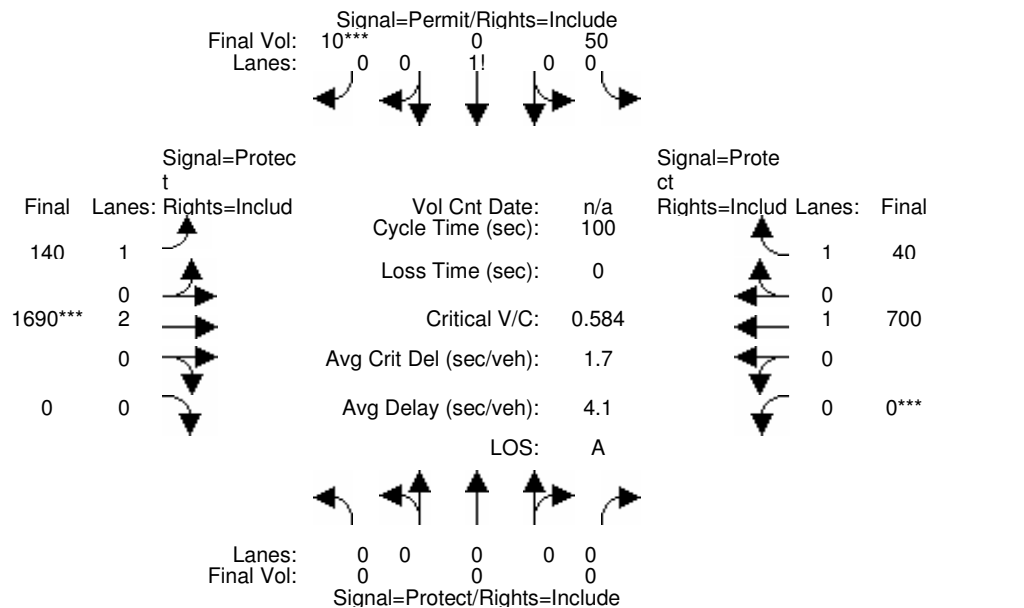
Intersection #17: Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	100	0	70	70	450	0	0	1230	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	100	0	70	70	450	0	0	1230	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	100	0	70	70	450	0	0	1230	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	100	0	70	70	450	0	0	1230	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	100	0	70	70	450	0	0	1230	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	100	0	70	70	450	0	0	1230	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.59	0.00	0.41	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	912	0	638	1550	3100	0	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.11	0.00	0.11	0.05	0.15	0.00	0.00	0.79	0.01
Crit Volume:	0					170	70			1230		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

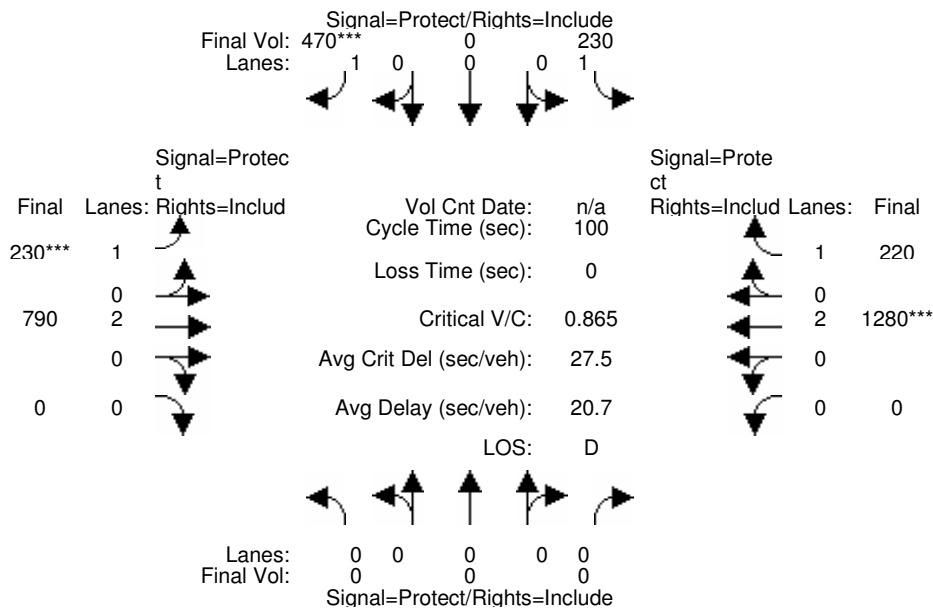
Intersection #17: Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	50	0	10	140	1690	0	0	700	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	50	0	10	140	1690	0	0	700	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	50	0	10	140	1690	0	0	700	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	50	0	10	140	1690	0	0	700	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	50	0	10	140	1690	0	0	700	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	50	0	10	140	1690	0	0	700	40
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.83	0.00	0.17	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1292	0	258	1550	3100	0	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.04	0.00	0.04	0.09	0.55	0.00	0.00	0.45	0.03
Crit Volume:	0					60	845		0			
Crit Moves:						****	****		****			

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 AM

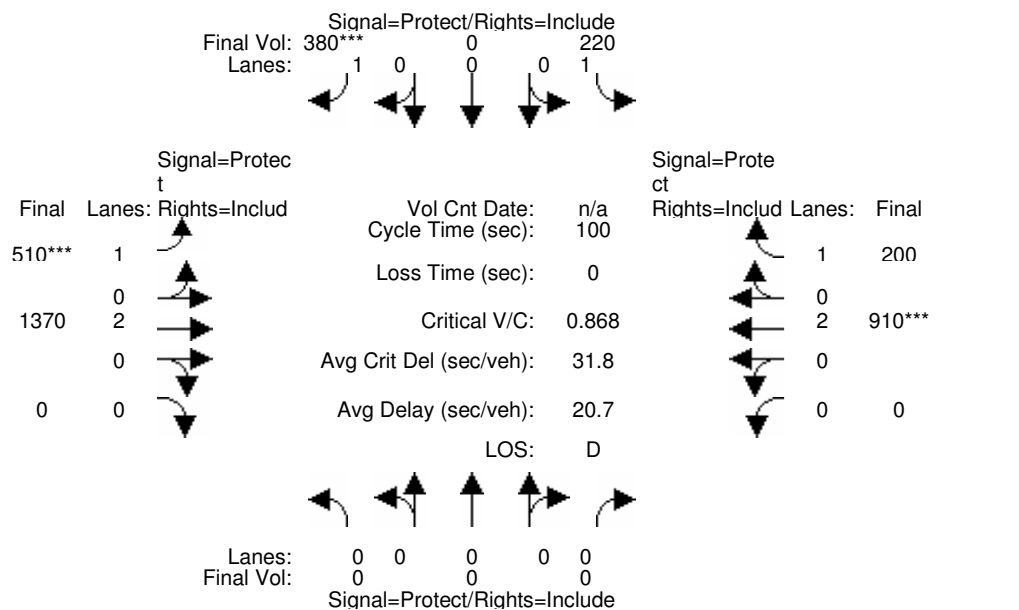
Intersection #18: Elverta Road / Palladay Road



Street Name:	Palladay Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	230	0	470	230	790	0	0	1280	220
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	230	0	470	230	790	0	0	1280	220
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	230	0	470	230	790	0	0	1280	220
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	230	0	470	230	790	0	0	1280	220
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	230	0	470	230	790	0	0	1280	220
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	230	0	470	230	790	0	0	1280	220
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.15	0.00	0.30	0.15	0.25	0.00	0.00	0.41	0.14
Crit Volume:	0					470	230				640	
Crit Moves:						****	****				****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

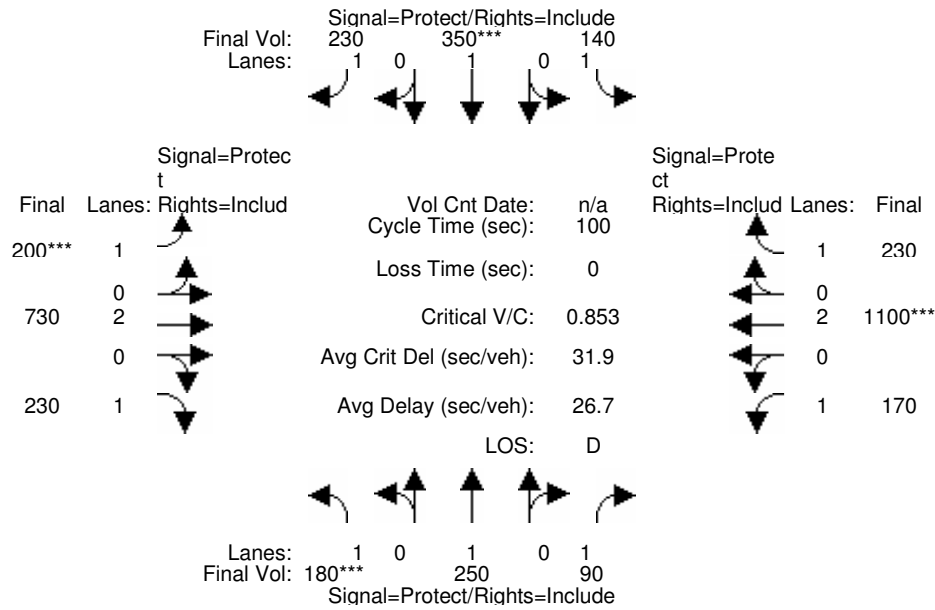
Intersection #18: Elverta Road / Palladay Road



Street Name:	Palladay Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	220	0	380	510	1370	0	0	910	200
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	220	0	380	510	1370	0	0	910	200
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	220	0	380	510	1370	0	0	910	200
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	220	0	380	510	1370	0	0	910	200
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	220	0	380	510	1370	0	0	910	200
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	220	0	380	510	1370	0	0	910	200
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.14	0.00	0.25	0.33	0.44	0.00	0.00	0.29	0.13
Crit Volume:	0					380	510				455	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 AM

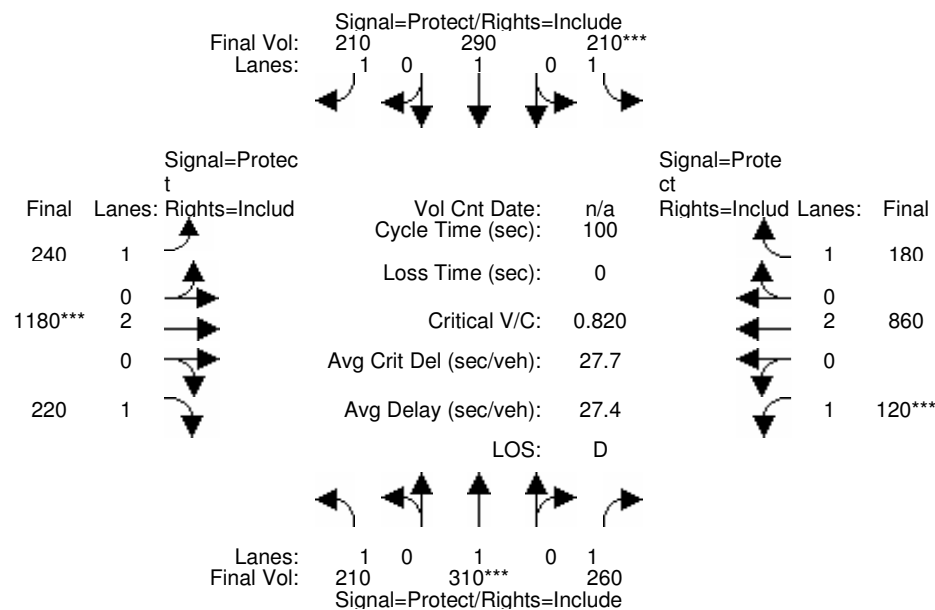
Intersection #19: Elverta Road / 16th Street



Street Name:	16th Street						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	180	250	90	140	350	230	200	730	230	170	1100	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	180	250	90	140	350	230	200	730	230	170	1100	230
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	180	250	90	140	350	230	200	730	230	170	1100	230
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	180	250	90	140	350	230	200	730	230	170	1100	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	180	250	90	140	350	230	200	730	230	170	1100	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	180	250	90	140	350	230	200	730	230	170	1100	230
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1500	1500	1500	1500	1500	1500	1500	3000	1500	1500	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.12	0.17	0.06	0.09	0.23	0.15	0.13	0.24	0.15	0.11	0.37	0.15
Crit Volume:	180			350			200			550		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

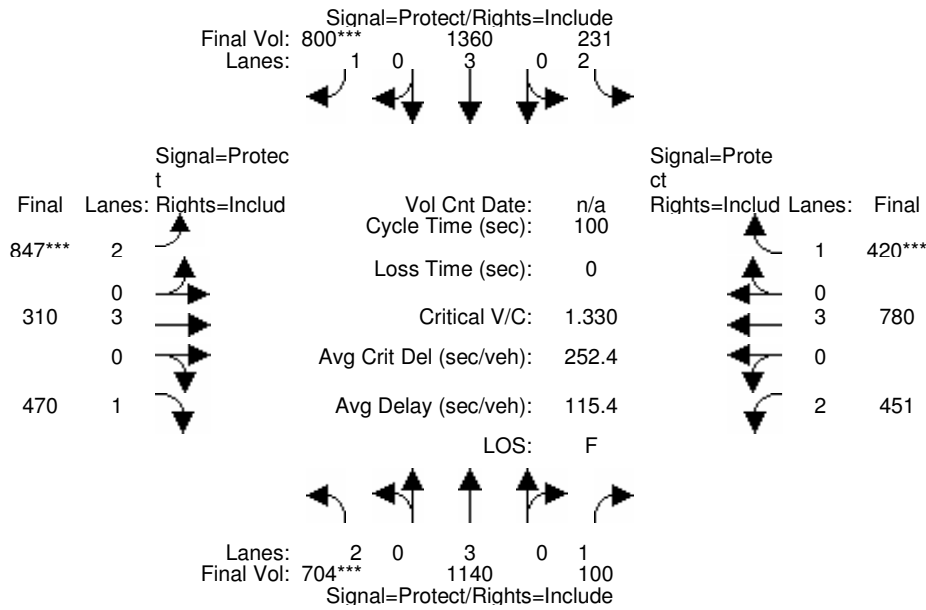
Intersection #19: Elverta Road / 16th Street



Street Name:	16th Street						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	210	310	260	210	290	210	240	1180	220	120	860	180
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	210	310	260	210	290	210	240	1180	220	120	860	180
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	210	310	260	210	290	210	240	1180	220	120	860	180
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	210	310	260	210	290	210	240	1180	220	120	860	180
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	210	310	260	210	290	210	240	1180	220	120	860	180
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	210	310	260	210	290	210	240	1180	220	120	860	180
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1500	1500	1500	1500	1500	1500	1500	3000	1500	1500	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.14	0.21	0.17	0.14	0.19	0.14	0.16	0.39	0.15	0.08	0.29	0.12
Crit Volume:		310			210			590			120	
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 AM

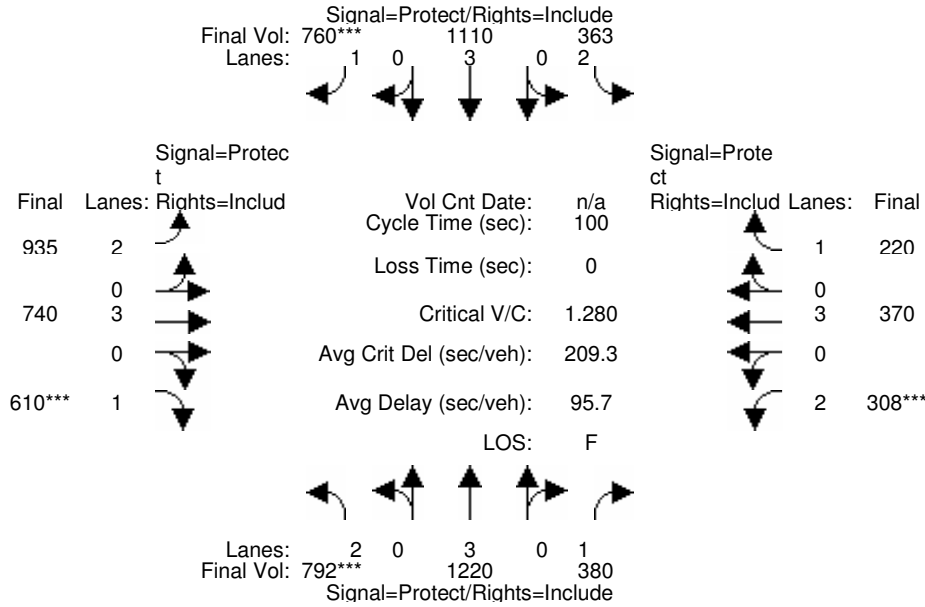
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	640	1140	100	210	1360	800	770	310	470	410	780	420
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	640	1140	100	210	1360	800	770	310	470	410	780	420
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	640	1140	100	210	1360	800	770	310	470	410	780	420
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	640	1140	100	210	1360	800	770	310	470	410	780	420
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	640	1140	100	210	1360	800	770	310	470	410	780	420
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	704	1140	100	231	1360	800	847	310	470	451	780	420
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.23	0.25	0.07	0.08	0.30	0.53	0.28	0.07	0.31	0.15	0.17	0.28
Crit Volume:	352					800	424					420
Crit Moves:	****					****	****					****

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

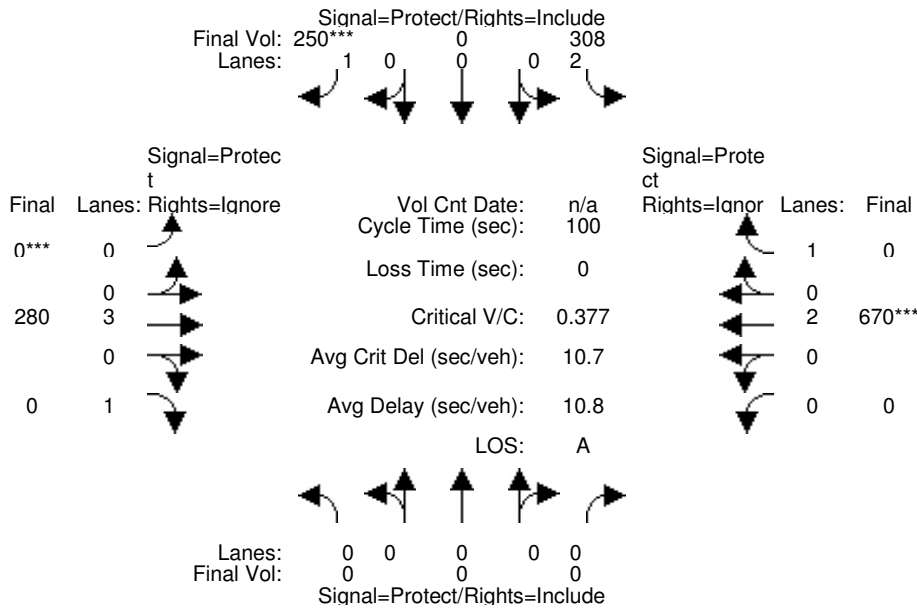
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	720	1220	380	330	1110	760	850	740	610	280	370	220
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	720	1220	380	330	1110	760	850	740	610	280	370	220
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	720	1220	380	330	1110	760	850	740	610	280	370	220
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	720	1220	380	330	1110	760	850	740	610	280	370	220
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	720	1220	380	330	1110	760	850	740	610	280	370	220
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	792	1220	380	363	1110	760	935	740	610	308	370	220
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.26	0.27	0.25	0.12	0.25	0.51	0.31	0.16	0.41	0.10	0.08	0.15
Crit Volume:	396					760			610	154		
Crit Moves:	****					****			****	****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 AM

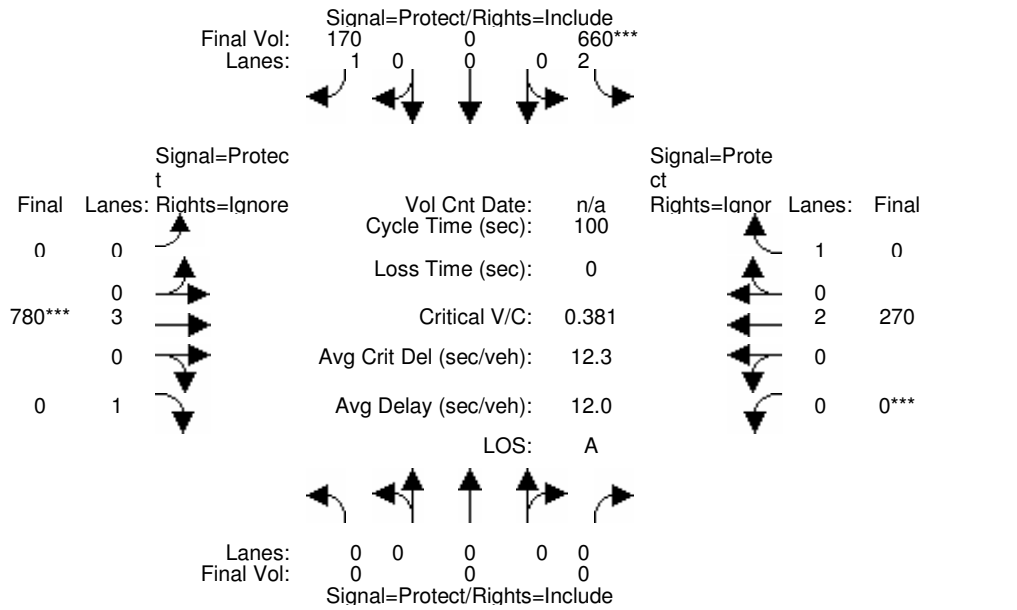
Intersection #21: Elkhorn Boulevard / SR 70 / SR99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	280	0	250	0	280	170	0	670	940
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	280	0	250	0	280	170	0	670	940
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	280	0	250	0	280	170	0	670	940
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	280	0	250	0	280	0	0	670	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	280	0	250	0	280	0	0	670	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	308	0	250	0	280	0	0	670	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	0	3100	0	1550	0	4650	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.10	0.00	0.16	0.00	0.06	0.00	0.00	0.22	0.00
Crit Volume:	0					250	0			335		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

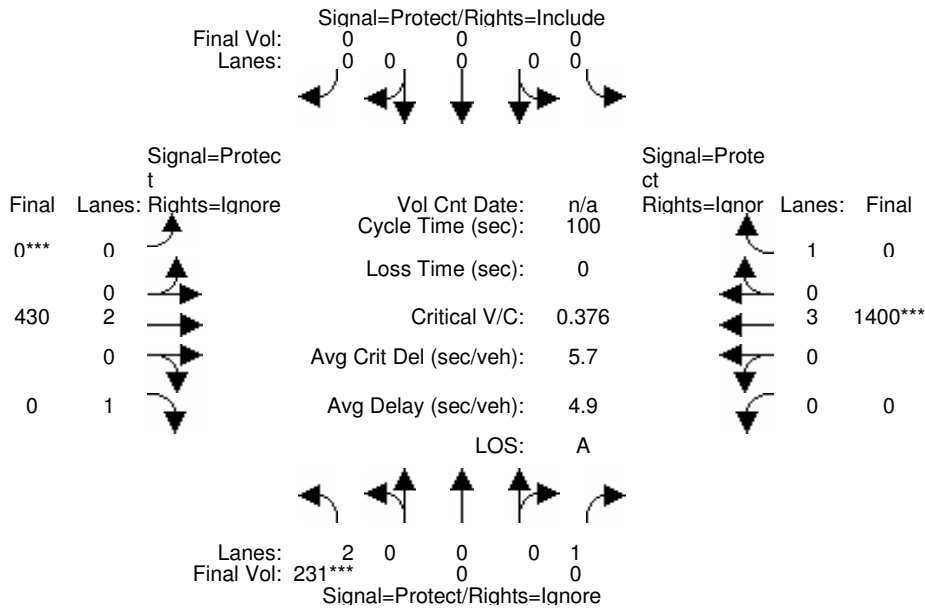
Intersection #21: Elkhorn Boulevard / SR 70 / SR99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	600	0	170	0	780	140	0	270	390
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	600	0	170	0	780	140	0	270	390
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	600	0	170	0	780	140	0	270	390
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	600	0	170	0	780	0	0	270	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	600	0	170	0	780	0	0	270	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	660	0	170	0	780	0	0	270	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	0	3100	0	1550	0	4650	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.21	0.00	0.11	0.00	0.17	0.00	0.00	0.09	0.00
Crit Volume:	0			330			260			0		
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 AM

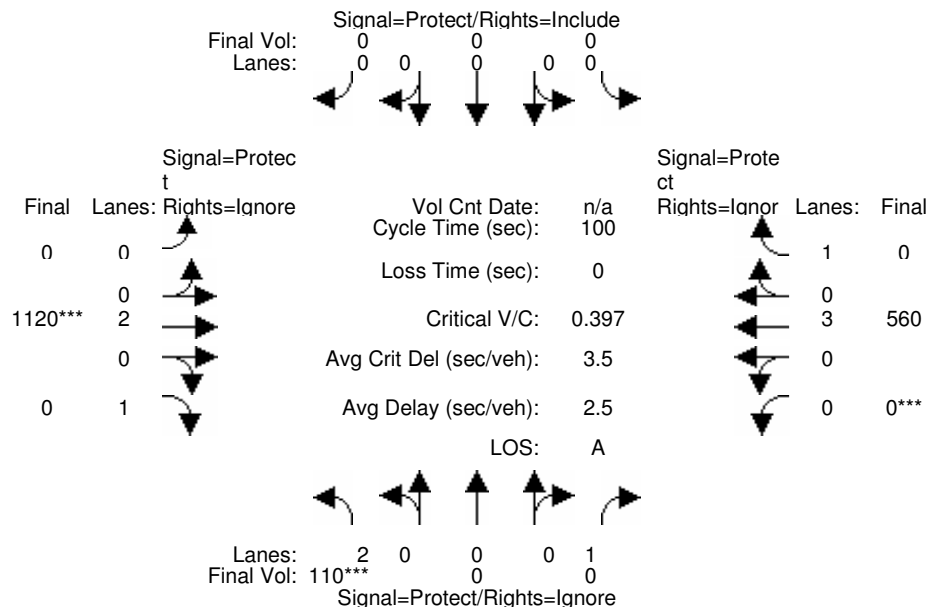
Intersection #22: Elkhorn Boulevard / SR 70 / SR 99 NB Ramps



Street Name:	SR 70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	210	0	560	0	0	0	0	430	130	0	1400	380
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	210	0	560	0	0	0	0	430	130	0	1400	380
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	210	0	560	0	0	0	0	430	130	0	1400	380
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	210	0	0	0	0	0	0	430	0	0	1400	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	210	0	0	0	0	0	0	430	0	0	1400	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.10	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	231	0	0	0	0	0	0	430	0	0	1400	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	3.00	1.00
Final Sat.:	3100	0	1550	0	0	0	0	3100	1550	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.30	0.00
Crit Volume:	116				0			0			467	
Crit Moves:	****							****			****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

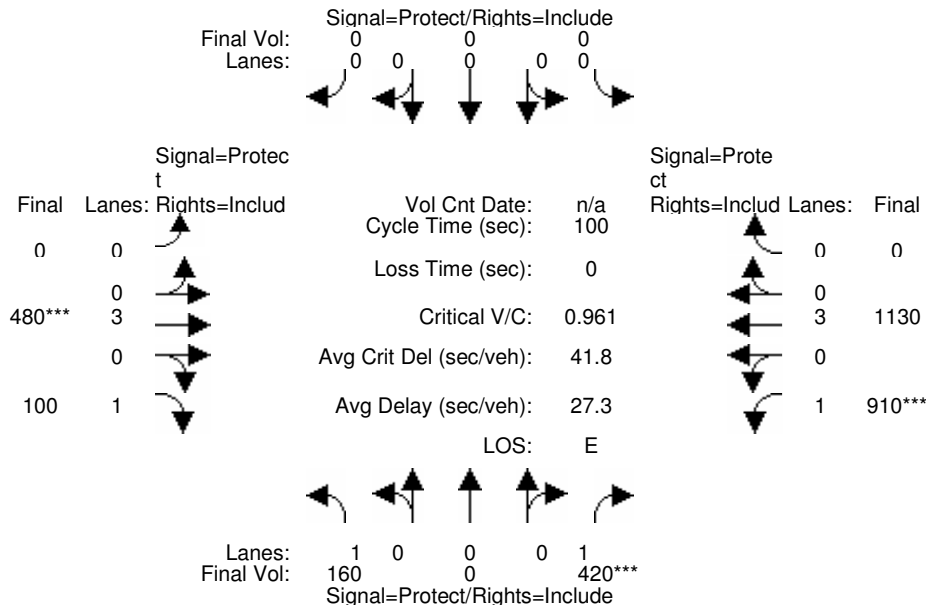
Intersection #22: Elkhorn Boulevard / SR 70 / SR 99 NB Ramps



Street Name:	SR 70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	100	0	1480	0	0	0	0	1120	260	0	560	400
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	100	0	1480	0	0	0	0	1120	260	0	560	400
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	100	0	1480	0	0	0	0	1120	260	0	560	400
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	100	0	0	0	0	0	0	1120	0	0	560	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	100	0	0	0	0	0	0	1120	0	0	560	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.10	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	110	0	0	0	0	0	0	1120	0	0	560	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	3.00	1.00
Final Sat.:	3100	0	1550	0	0	0	0	3100	1550	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.12	0.00
Crit Volume:	55							560				
Crit Moves:	****							****			****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 AM

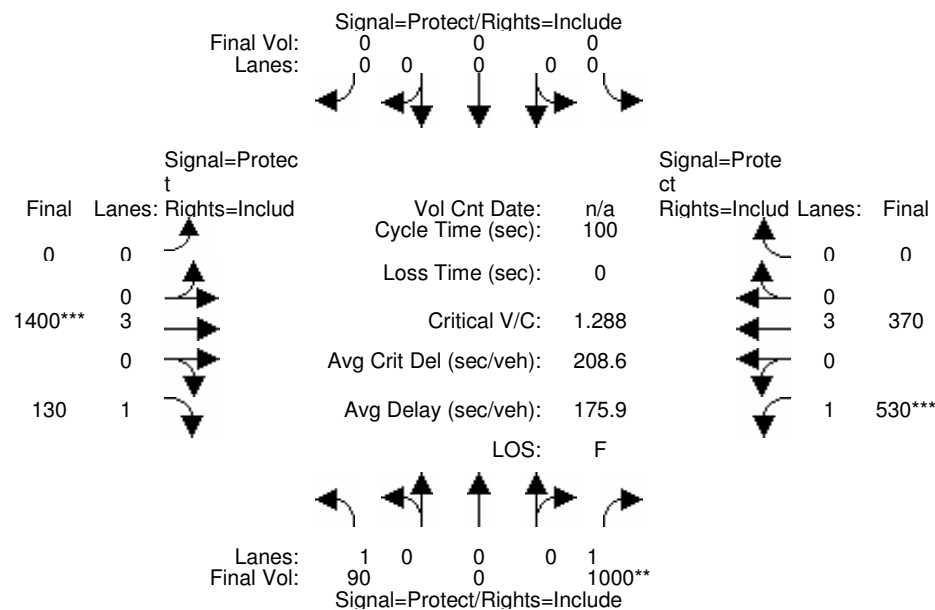
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	160	0	420	0	0	0	0	480	100	910	1130	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	160	0	420	0	0	0	0	480	100	910	1130	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	160	0	420	0	0	0	0	480	100	910	1130	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	160	0	420	0	0	0	0	480	100	910	1130	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	160	0	420	0	0	0	0	480	100	910	1130	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	160	0	420	0	0	0	0	480	100	910	1130	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	1550	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.10	0.00	0.27	0.00	0.00	0.00	0.00	0.10	0.06	0.59	0.24	0.00
Crit Volume:			420	0			160			910		
Crit Moves:			***				***			***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

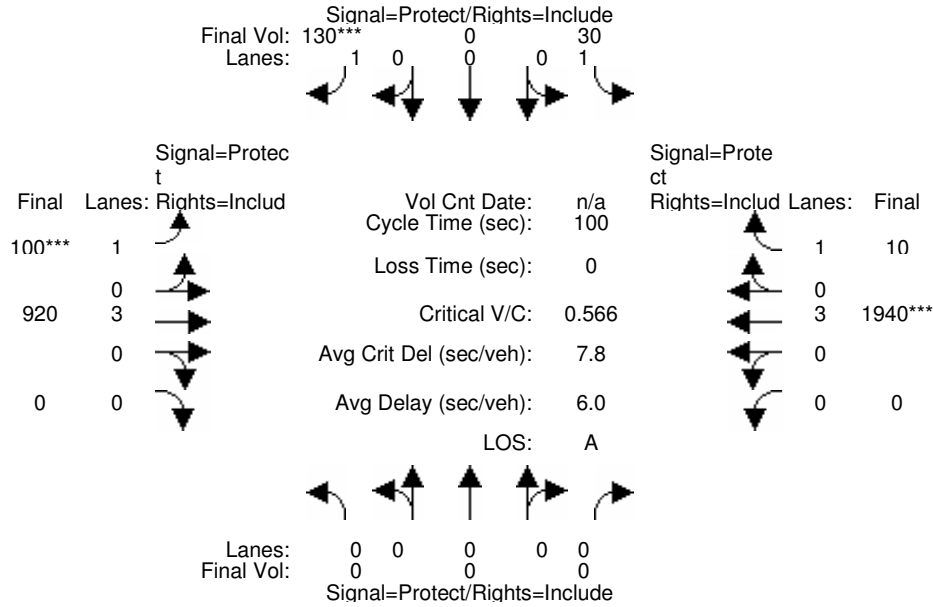
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	90	0	1000	0	0	0	0	1400	130	530	370	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	90	0	1000	0	0	0	0	1400	130	530	370	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	90	0	1000	0	0	0	0	1400	130	530	370	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	90	0	1000	0	0	0	0	1400	130	530	370	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	90	0	1000	0	0	0	0	1400	130	530	370	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	90	0	1000	0	0	0	0	1400	130	530	370	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	1550	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.65	0.00	0.00	0.00	0.00	0.30	0.08	0.34	0.08	0.00
Crit Volume:			1000	0				467		530		
Crit Moves:			***					***		***		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 AM

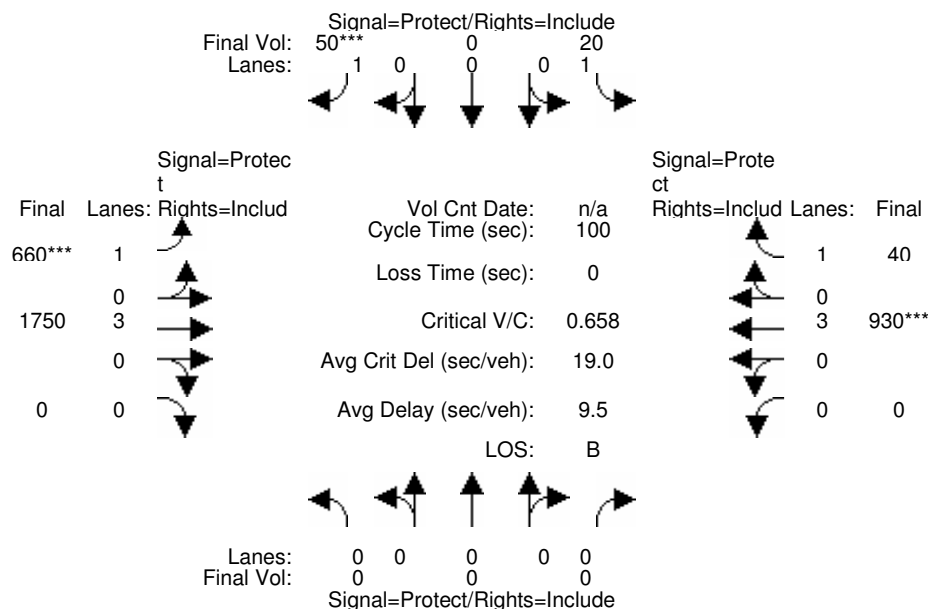
Intersection #24: Elk Horn Boulevard / East Levee Road



Street Name:	East Levee Road						Elk Horn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	30	0	130	100	920	0	0	1940	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	30	0	130	100	920	0	0	1940	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	30	0	130	100	920	0	0	1940	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	30	0	130	100	920	0	0	1940	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	30	0	130	100	920	0	0	1940	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	30	0	130	100	920	0	0	1940	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	4650	0	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.08	0.06	0.20	0.00	0.00	0.42	0.01
Crit Volume:	0					130	100				647	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 PM

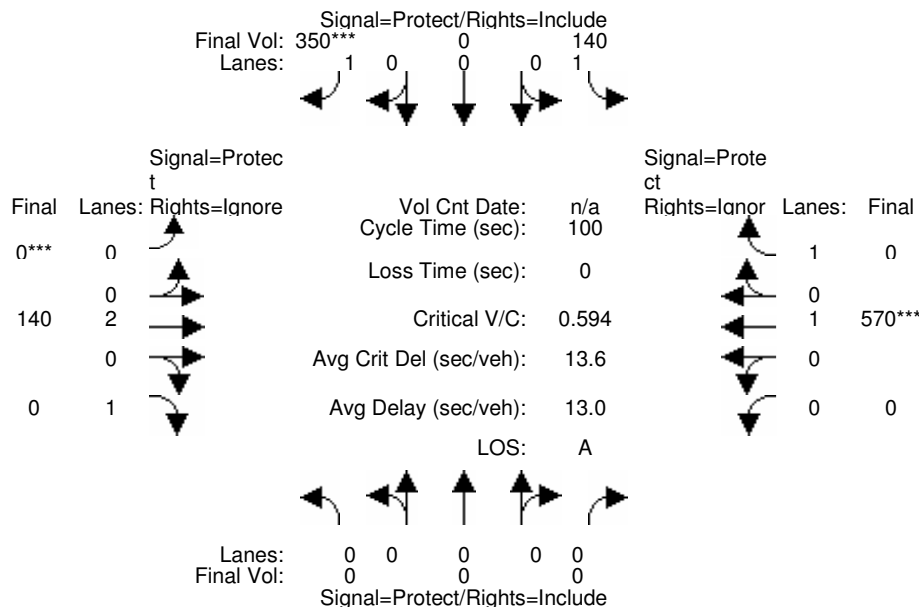
Intersection #24: Elk Horn Boulevard / East Levee Road



Street Name:	East Levee Road						Elk Horn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	20	0	50	660	1750	0	0	930	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	20	0	50	660	1750	0	0	930	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	20	0	50	660	1750	0	0	930	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	20	0	50	660	1750	0	0	930	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	20	0	50	660	1750	0	0	930	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	20	0	50	660	1750	0	0	930	40
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	4650	0	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.01	0.00	0.03	0.43	0.38	0.00	0.00	0.20	0.03
Crit Volume:	0					50	660			310		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 AM

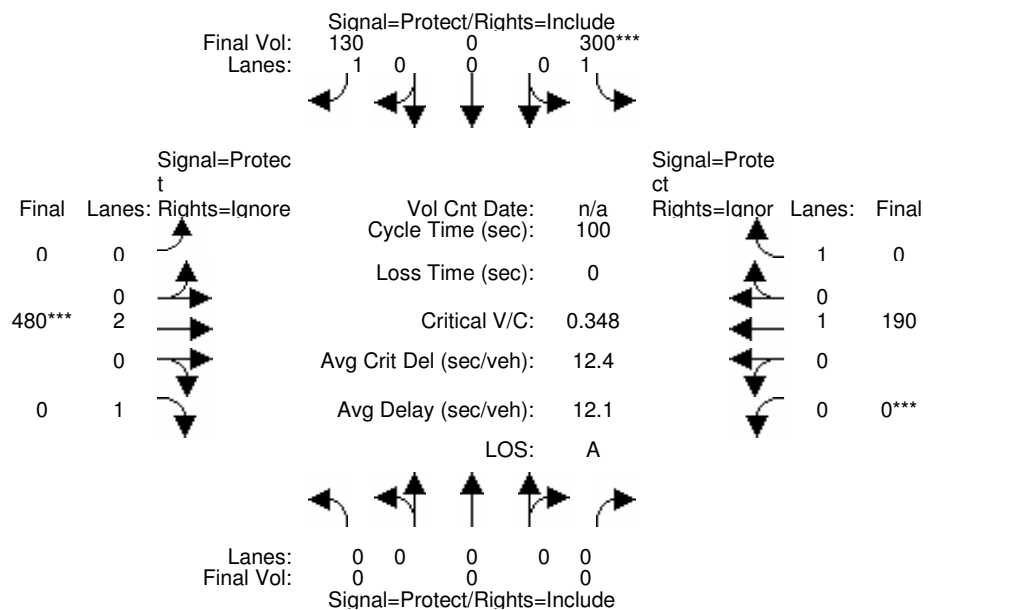
Intersection #64:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	140	0	350	0	140	30	0	570	820
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	140	0	350	0	140	30	0	570	820
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	140	0	350	0	140	30	0	570	820
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	140	0	350	0	140	0	0	570	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	140	0	350	0	140	0	0	570	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	140	0	350	0	140	0	0	570	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	3100	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.09	0.00	0.23	0.00	0.05	0.00	0.00	0.37	0.00
Crit Volume:	0					350	0				570	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 PM

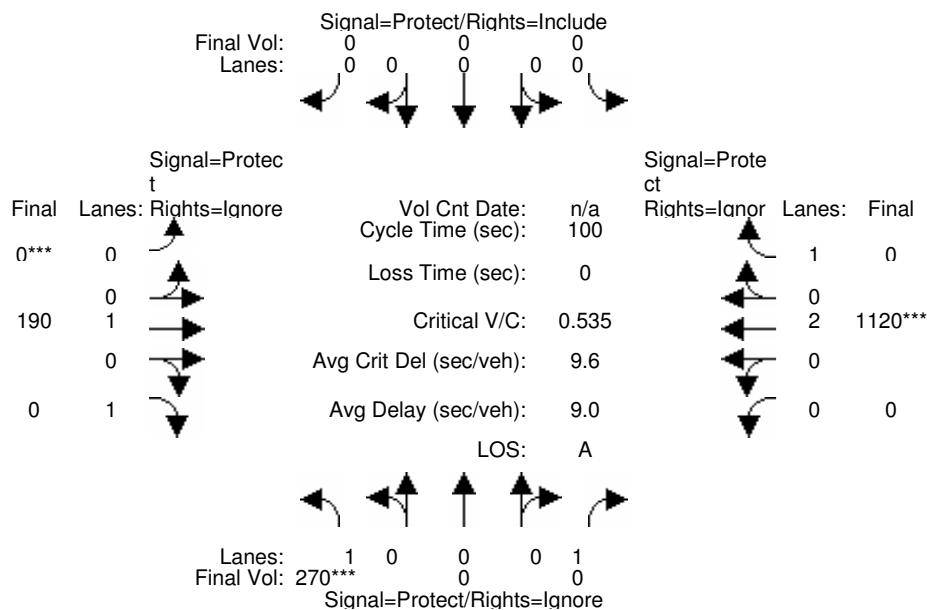
Intersection #64:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	300	0	130	0	480	330	0	190	500
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	300	0	130	0	480	330	0	190	500
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	300	0	130	0	480	330	0	190	500
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	300	0	130	0	480	0	0	190	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	300	0	130	0	480	0	0	190	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	300	0	130	0	480	0	0	190	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	3100	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.19	0.00	0.08	0.00	0.15	0.00	0.00	0.12	0.00
Crit Volume:	0			300			240			0		
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 AM

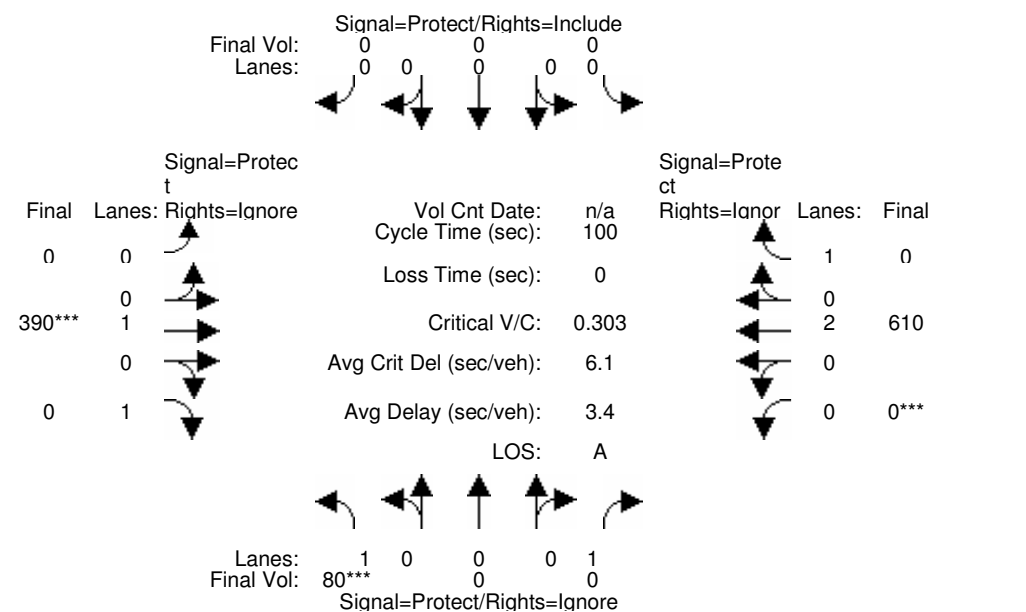
Intersection #65:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	270	0	300	0	0	0	0	190	90	0	1120	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	270	0	300	0	0	0	0	190	90	0	1120	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	270	0	300	0	0	0	0	190	90	0	1120	40
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	270	0	0	0	0	0	0	190	0	0	1120	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	270	0	0	0	0	0	0	190	0	0	1120	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	270	0	0	0	0	0	0	190	0	0	1120	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.36	0.00
Crit Volume:	270										560	
Crit Moves:	****						****				****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

Intersection #65:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	80	0	760	0	0	0	0	390	390	0	610	200
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	80	0	760	0	0	0	0	390	390	0	610	200
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	80	0	760	0	0	0	0	390	390	0	610	200
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	80	0	0	0	0	0	0	390	0	0	610	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	80	0	0	0	0	0	0	390	0	0	610	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	80	0	0	0	0	0	0	390	0	0	610	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.20	0.00
Crit Volume:	80							390			0	
Crit Moves:	****							****			****	

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 6000 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 360 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	6000	360	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1630	98	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7337	401	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 4278$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	7738	7050	Yes
$v v$	3059 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		Yes	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 4637$		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	4637	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 43.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.904
S
Space mean speed in ramp influence area, S = 44.2 mph
R
Space mean speed in outer lanes, S = 56.1 mph
O
Space mean speed for all vehicles, S = 47.7 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7910 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1310 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	7910	1310	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	2149	356	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8942	1460	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 4722$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	8942	9400	No
Fi F			
v = v - v	7482	9400	No
FO F R			
v	1460	2100	No
R			
v v	2110 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4722	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 40.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.429$
S
Space mean speed in ramp influence area, $S = 55.1$ mph
R
Space mean speed in outer lanes, $S = 67.0$ mph
0
Space mean speed for all vehicles, $S = 60.1$ mph

Average passenger-car speed, S 59.0 mi/h
 Number of lanes, N 2
 Density, D 36.0 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3470 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 943 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2122 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2122 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3470 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 770 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3470	770	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	943	209	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4243		858		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4243$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4243	4700	No
Fi F			
$v = v - v$	3385	4700	No
FO F R			
v	858	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4243	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 38.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.375$
S
Space mean speed in ramp influence area, $S = 56.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2700 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 130 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2700	130	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	734	35	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3302	145	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3302$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3447	4700	No
v/v	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v/v > 2700$ pc/h?			No
3 or av34			
Is $v/v > 1.5 v/2$			No
3 or av34	12		
If yes, v =			(Equation 25-8)
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3302	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 29.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.418
S
Space mean speed in ramp influence area, S = 55.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.4 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/8
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2830 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 380 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2830	380	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	769	103	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3461	423	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3461 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3884	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3461	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 32.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.466
S
Space mean speed in ramp influence area, S = 54.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.3 mph

Average passenger-car speed, S 62.0 mi/h
 Number of lanes, N 2
 Density, D 31.6 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3210 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 872 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1963 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1963 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3210 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3210	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	872	155	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3925		635		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3925$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3925	4700	No
Fi F			
$v = v - v$	3290	4700	No
FO F R			
v	635	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3925	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 35.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2640 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 90 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2640	90	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	717	24	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3228	100	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 3228 \text{ pc/h}$
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3328	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700 \text{ pc/h?}$		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3228	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.3 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.405
S
Space mean speed in ramp influence area, S = 55.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2730 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 40 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2730	40	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	742	11	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3338	45	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3338$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
v	3383	4700	No
FO			
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
v	3338	4400	No
12			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.391
S
Space mean speed in ramp influence area, S = 56.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 56.0 mph

Average passenger-car speed, S 64.6 mi/h
 Number of lanes, N 2
 Density, D 26.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2770 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 753 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1694 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1694 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 372 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 838 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 838 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 372 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 838 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 838 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.2 mi/h
 Number of lanes, N 2
 Density, D 27.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMo
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3110 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 845 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1758 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1758 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.3 mi/h
 Number of lanes, N 2
 Density, D 27.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3090 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 840 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1747 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1747 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4910 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 490 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4910	490	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1334	133	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5550		546		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5550$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5550	4700	Yes
Fi F			
$v = v - v$	5004	4700	Yes
FO F R			
v	546	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5550	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 49.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.347$
S
Space mean speed in ramp influence area, $S = 57.0$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.0$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4420 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 820 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4420	820	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1201	223	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4997	914	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4997 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5911	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4997	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 48.0 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.735
S
Space mean speed in ramp influence area, S = 25.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 25.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5240 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 30 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5240	30	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1424	8	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5923	33	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5923$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5956	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5923	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 48.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.782
S
Space mean speed in ramp influence area, S = 24.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 24.0 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5270 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 530 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5270	530	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1432	144	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5957		590		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5957$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5957	4700	Yes
Fi F			
v = v - v	5367	4700	Yes
FO F R			
v	590	4100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5957	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 37.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.351$
S
Space mean speed in ramp influence area, $S = 56.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4740 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 940 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4740	940	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1288	255	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5358	1047	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5358$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6405	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5358	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 51.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.655
S
Space mean speed in ramp influence area, S = 3.9 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 3.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5680 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5680	170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1543	46	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6421	189	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 6421$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6610	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	6421	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 53.8$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 3.172
S
Space mean speed in ramp influence area, S = -7.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = mph

HCS+: Ramps and Ramp

Junctions Release 5.21

Phone:
E-mail:

Fax:

_____ Diverge
Analysis _____

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

_____ Freeway
Data _____

Type of analysis
Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0
mph
Volume on freeway 5850
vph

_____ Off Ramp
Data _____

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0
mph
Volume on ramp 1416
vph
Length of first accel/decel lane 1500
ft

Length of second accel/decel lane
ft

_____ Adjacent Ramp Data (if
one exists) _____

Does adjacent ramp exist? No
Volume on adjacent ramp
vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp
ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway
Ramp	Adjacent
Ramp	
Volume, V (vph)	5850
1416	vph
Peak-hour factor, PHF	0.92
0.92	
Peak 15-min volume, v15	1590
385	v
Trucks and buses	8
5	%
Recreational vehicles	0
0	%
Terrain type:	Level
Level	
Grade	0.00 %
0.00 %	%
Length	0.00 mi
0.00 mi	mi
Trucks and buses PCE, ET	1.5
1.5	
Recreational vehicle PCE, ER	1.2
1.2	
Heavy vehicle adjustment, fHV	0.962
0.976	
Driver population factor, fP	1.00
1.00	
Flow rate, vp	6613
1578	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8)
or 25-9)

EQ
P = 1.000 Using Equation
0

FD
v = v + (v - v) P = 6613

pc/h

12 R F R FD

Capacity Checks

	Actual	Maximum
LOS F? v = v	6613	4700
Yes Fi F v = v - v	5035	4700
Yes FO F R v	1578	2200
No R v v	0	pc/h (Equation 25-15 or 25-16)
Is v v > 2700 pc/h? 3 or av34		No
Is v v > 1.5 v /2 3 or av34	12	No
If yes, v = 25-18)		(Equation 12A)

Flow Entering Diverge Influence Area

	Actual	Max Desirable
Violation? v	6613	4600
No 12		
!		

Level of Service Determination (if not F)

Density, D = 4.252 + 0.0086 v -
0.009 L = 47.6 pc/mi/ln
R 12

D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, 0.180	D =
Space mean speed in ramp influence area, 60.9 mph	S =
Space mean speed in outer lanes, N/A mph	R =
Space mean speed for all vehicles, 60.9 mph	S =

HCS+: Ramps and Ramp

Junctions Release 5.21

Phone:
E-mail:

Fax:

_____ Merge
Analysis _____

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

_____ Freeway
Data _____

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway mph	65.0
Volume on freeway vph	3662

_____ On Ramp
Data _____

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp mph	65.0
Volume on ramp vph	1416
Length of first accel/decel lane ft	1500

Length of second accel/decel lane
ft

_____ Adjacent Ramp Data (if
one exists) _____

Does adjacent ramp exist? No
Volume on adjacent Ramp
vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp
ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway
Ramp	Adjacent
Volume, V (vph)	3662
1416 vph	
Peak-hour factor, PHF	0.92
0.92	
Peak 15-min volume, v15	995
385 v	
Trucks and buses	8
5 %	
Recreational vehicles	0
0 %	
Terrain type:	Level
Level	
Grade	%
%	
Length	mi
mi	
Trucks and buses PCE, ET	1.5
1.5	
Recreational vehicle PCE, ER	1.2
1.2	
Heavy vehicle adjustment, fHV	0.962
0.976	
Driver population factor, fP	1.00
1.00	
Flow rate, vp	4140
1578 pcph	

Estimation of V12 Merge
Areas

or 25-3) $L =$ (Equation 25-2)
 EQ
 $P = 1.000$ Using Equation
 0
 FM
 $v_{12} = v_F (P_{FM}) = 4140$ pc/h

Capacity
Checks

	Actual	Maximum
LOS F? v	5718	4700
Yes FO v v	0	pc/h (Equation
25-4 or 25-5) 3 or av34		
Is v v > 2700 pc/h?		No
3 or av34		
Is v v > 1.5 v /2		No
3 or av34 12		
If yes, v =		(Equation
25-8)		
12A		

Flow Entering Merge
Influence Area

	Actual	Max Desirable
Violation? v	4140	4400
No 12		
!		

Level of Service Determination
(if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v -$
 $0.00627 L = 39.9$ pc/mi/ln
 R R 12

A

Level of service for ramp-freeway junction areas
of influence F

Speed
Estimation

Intermediate speed variable, 1.313	M =
Space mean speed in ramp influence area, 34.8 mph	S =
Space mean speed in outer lanes, N/A mph	R S =
Space mean speed for all vehicles, 34.8 mph	0 S =

HCS+: Ramps and Ramp
 Junctions Release 5.21

Phone:
 E-mail:

Fax:

_____ Diverge
 Analysis _____

Analyst: KS
 Agency/Co.: Fehr & Peers
 Date performed: 8/28/2007
 Analysis time period: AM Peak Hour
 Freeway/Dir of Travel: SB I-5
 Junction: NB SR-99 Diverge
 Jurisdiction: Sutter Co.
 Analysis Year: Cumulative PP NPP
 Description: South Sutter Co.

_____ Freeway
 Data _____

Type of analysis
 Diverge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0
 mph
 Volume on freeway 4238
 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 65.0
 mph
 Volume on ramp 592
 vph
 Length of first accel/decel lane 1500
 ft

Length of second accel/decel lane
 ft

_____ Adjacent Ramp Data (if
 one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp
 vph
 Position of adjacent ramp
 Type of adjacent ramp
 Distance to adjacent ramp
 ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway
Ramp Adjacent	
Ramp	
Volume, V (vph)	4238
592	vph
Peak-hour factor, PHF	0.92
0.92	
Peak 15-min volume, v15	1152
161	v
Trucks and buses	8
5	%
Recreational vehicles	0
0	%
Terrain type:	Level
Level	
Grade	0.00 %
0.00 %	%
Length	0.00 mi
0.00 mi	mi
Trucks and buses PCE, ET	1.5
1.5	
Recreational vehicle PCE, ER	1.2
1.2	
Heavy vehicle adjustment, fHV	0.962
0.976	
Driver population factor, fP	1.00
1.00	
Flow rate, vp	4791
660	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8)
or 25-9)

EQ
P = 1.000 Using Equation

0

FD
 $v = v + (v - v) P = 4791$

pc/h

12 R F R FD

Capacity Checks

	Actual	Maximum
LOS F?		
Yes $v = v$	4791	4700
No $v = v - v$	4131	4700
No $v = v - v$	660	2200
No $v = v$	0	pc/h (Equation 25-15 or 25-16)
Is $v > 2700$ pc/h?		No
Is $v > 1.5 v / 2$		No
If yes, $v =$		(Equation 25-18)
12A		

Flow Entering Diverge Influence Area

Violation?	Actual	Max Desirable
No v	4791	4600
12		
!		

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 32.0$ pc/mi/ln
R 12

D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, 0.097	D =
Space mean speed in ramp influence area, 62.8 mph	S =
Space mean speed in outer lanes, N/A mph	R =
Space mean speed for all vehicles, 62.8 mph	S =

HCS+: Ramps and Ramp

Junctions Release 5.21

Phone:
E-mail:

Fax:

_____ Merge
Analysis _____

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

_____ Freeway
Data _____

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway mph	65.0
Volume on freeway vph	2698

_____ On Ramp
Data _____

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp mph	65.0
Volume on ramp vph	592
Length of first accel/decel lane ft	1500

Length of second accel/decel lane
ft

_____ Adjacent Ramp Data (if
one exists) _____

Does adjacent ramp exist? No
Volume on adjacent Ramp
vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp
ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway
Ramp	Adjacent
Volume, V (vph)	2698
592 vph	
Peak-hour factor, PHF	0.92
0.92	
Peak 15-min volume, v15	733
161 v	
Trucks and buses	25
5 %	
Recreational vehicles	0
0 %	
Terrain type:	Level
Level	
Grade	%
%	%
Length	mi
mi	mi
Trucks and buses PCE, ET	1.5
1.5	
Recreational vehicle PCE, ER	1.2
1.2	
Heavy vehicle adjustment, fHV	0.889
0.976	
Driver population factor, fP	1.00
1.00	
Flow rate, vp	3299
660 pcph	

Estimation of V12 Merge
Areas

or 25-3) $L =$ (Equation 25-2)
 EQ
 $P = 1.000$ Using Equation
 0
 FM
 $v_{12} = v_F (P_{FM}) = 3299$ pc/h

Capacity
Checks

	Actual	Maximum
LOS F? v	3959	4700
No FO v v	0	pc/h (Equation
25-4 or 25-5) 3 or av34		
Is v v > 2700 pc/h?		No
3 or av34		
Is v v > 1.5 v /2		No
3 or av34	12	
If yes, v =		(Equation
25-8)		
12A		

Flow Entering Merge
Influence Area

	Actual	Max Desirable
Violation? v	3299	4400
No 12		
!		

Level of Service Determination
(if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v -$
 $0.00627 L = 26.6$ pc/mi/ln
 R R 12

A

Level of service for ramp-freeway junction areas
of influence C

Speed
Estimation

Intermediate speed variable, 0.330	M =
Space mean speed in ramp influence area, 57.4 mph	S =
Space mean speed in outer lanes, N/A mph	R S =
Space mean speed for all vehicles, 57.4 mph	0 S =

Leisch Method for Weaving Analysis

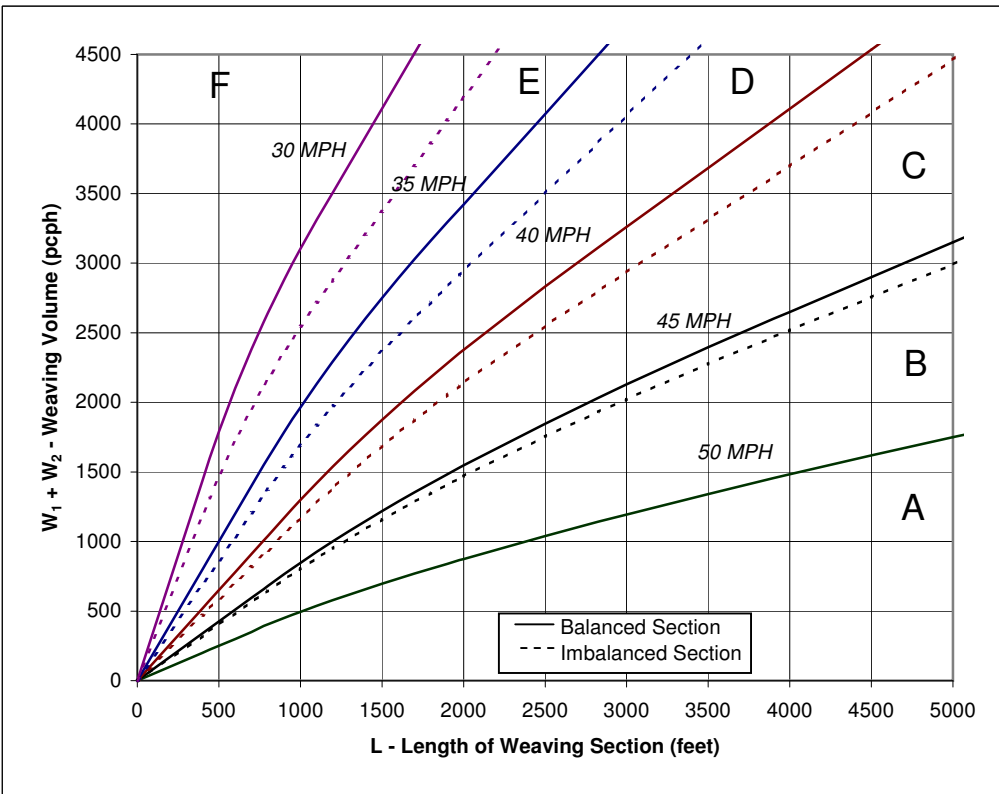
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

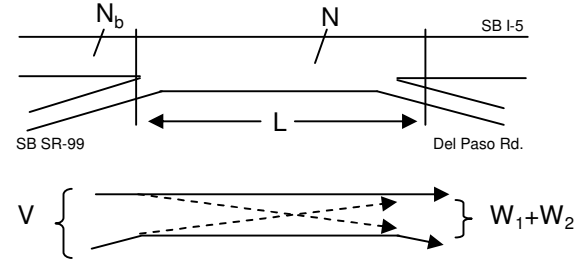
Project Information

Project	South Sutter County
Scenario	Cumulative PP1 NPP - AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	7,910	4,264	1,310
Truck Percentage	8%	5%	5%
PCE for Trucks	1.5	1.5	1.5
Volume (pcph)	8,226	4,371	1,343



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **15.0**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,728**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	6360	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	6360	2698
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.8889
----------	--------

v_i	7777.174	pc/hr/ln
-------	----------	----------

Density, D	28.3	pc/mi/ln
-------------------	-------------	----------

LOS	D
------------	----------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP NPP1 AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 7980 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 740 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	7980	740	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	2057	191	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8556	782	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 4989$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	9338	7050	Yes
v/v	3567 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v/v > 2700$ pc/h?		Yes	
3 or av34			
Is $v/v > 1.5 v/2$		No	
3 or av34	12		
If yes, v = 5856		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	5856	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 55.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 3.281
S
Space mean speed in ramp influence area, S = -10.5 mph
R
Space mean speed in outer lanes, S = 56.1 mph
O
Space mean speed for all vehicles, S = mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7130 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 780 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	7130	780	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1838	201	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 7792 824 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 3862$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	7792	9400	No
Fi F			
v = v - v	6968	9400	No
FO F R			
v	824	2100	No
R			
v v	1965 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3862	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 33.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.372$
S
Space mean speed in ramp influence area, $S = 56.4$ mph
R
Space mean speed in outer lanes, $S = 67.5$ mph
0
Space mean speed for all vehicles, $S = 61.5$ mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 6190 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	6190	1580	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1595	407	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	6637		1670		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6637$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6637	4700	Yes
Fi F			
$v = v - v$	4967	4700	Yes
FO F R			
v	1670	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	6637	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 58.6$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.448$
S
Space mean speed in ramp influence area, $S = 54.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4610 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 260 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4610	260	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1188	67	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4943	275	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4943 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5218	4700	Yes
v v	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4943	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 42.9 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.016
S
Space mean speed in ramp influence area, S = 41.6 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 41.6 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4870 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 400 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4870	400	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1255	103	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5221	423	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5221$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5644	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5221	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 46.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.378
S
Space mean speed in ramp influence area, S = 33.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 33.3 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5270 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 840 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5270	840	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1358	216	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5650		888		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5650$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5650	4700	Yes
Fi F			
v = v - v	4762	4700	Yes
FO F R			
v	888	2100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5650	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 50.1$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.378$
S
Space mean speed in ramp influence area, $S = 56.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.3$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4430 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 390 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4430	390	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1142	101	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4750	412	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4750$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5162	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4750	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 42.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.977
S
Space mean speed in ramp influence area, S = 42.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 42.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4820 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 200 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4820	200	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1242	52	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5168	211	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5168 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5379 4700 Yes
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5168	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 44.2 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.122
S
Space mean speed in ramp influence area, S = 39.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 39.2 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.6 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riega Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2860 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 737 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1533 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1533 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2870 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 740 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1539 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1539 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1600 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 412 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 874 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 874 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1590 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 410 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 869 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 869 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S	53.2	mi/h
Number of lanes, N	2	
Density, D	43.6	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V	4250	veh/h
Peak-hour factor, PHF	0.97	
Peak 15-min volume, v15	1095	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2322	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h

Urban Freeway

LOS and Performance Measures

Flow rate, vp	2322	pc/h/ln
Free-flow speed, FFS	65.0	mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4250 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 430 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4250	430	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1095	111	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4644		454		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4644$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4644	4700	No
Fi F			
v = v - v	4190	4700	No
FO F R			
v	454	2100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4644	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 41.5$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.339$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3820 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 500 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3820	500	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	985	129	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4174	528	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4174 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4702	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4174	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 38.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.726
S
Space mean speed in ramp influence area, S = 48.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 48.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4320 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4320	330	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1113	85	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4721	349	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4721 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5070	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4721	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 41.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.897
S
Space mean speed in ramp influence area, S = 44.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 44.4 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4650 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 770 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4650	770	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1198	198	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5081		814		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5081$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5081	4700	Yes
Fi F			
$v = v - v$	4267	4700	No
FO F R			
v	814	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5081	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 29.9$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.371$
S
Space mean speed in ramp influence area, $S = 56.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.5$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3880 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 390 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3880	390	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1000	101	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4240	412	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 4240$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4652 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4240	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 38.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.705
S
Space mean speed in ramp influence area, S = 48.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 48.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4270 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 140 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	4270	140	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1101	36	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4666	148	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4666 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4814	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4666	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 39.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.757
S
Space mean speed in ramp influence area, S = 47.6 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 47.6 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4410 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1002 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4410	1002	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1137	258	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4819		1059		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4819$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4819	4700	Yes
Fi F			
$v = v - v$	3760	4700	No
FO F R			
v	1059	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4819	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 32.2$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.133$
S
Space mean speed in ramp influence area, $S = 61.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3840 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1002 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3840	1002	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	990	258	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4117	1059	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4117$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5176	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4117	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.816
S
Space mean speed in ramp influence area, S = 46.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 46.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4972 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1150 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4972	1150	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1281	296	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 5433 1215 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5433$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5433	4700	Yes
Fi F			
v = v - v	4218	4700	No
FO F R			
v	1215	2200	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5433	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 37.5$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.147$
S
Space mean speed in ramp influence area, $S = 61.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4880 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	1150 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4880	1150	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1258	296	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5232	1215	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5232 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6447	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5232	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 45.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.586
S
Space mean speed in ramp influence area, S = 5.5 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 5.5 mph

Leisch Method for Weaving Analysis

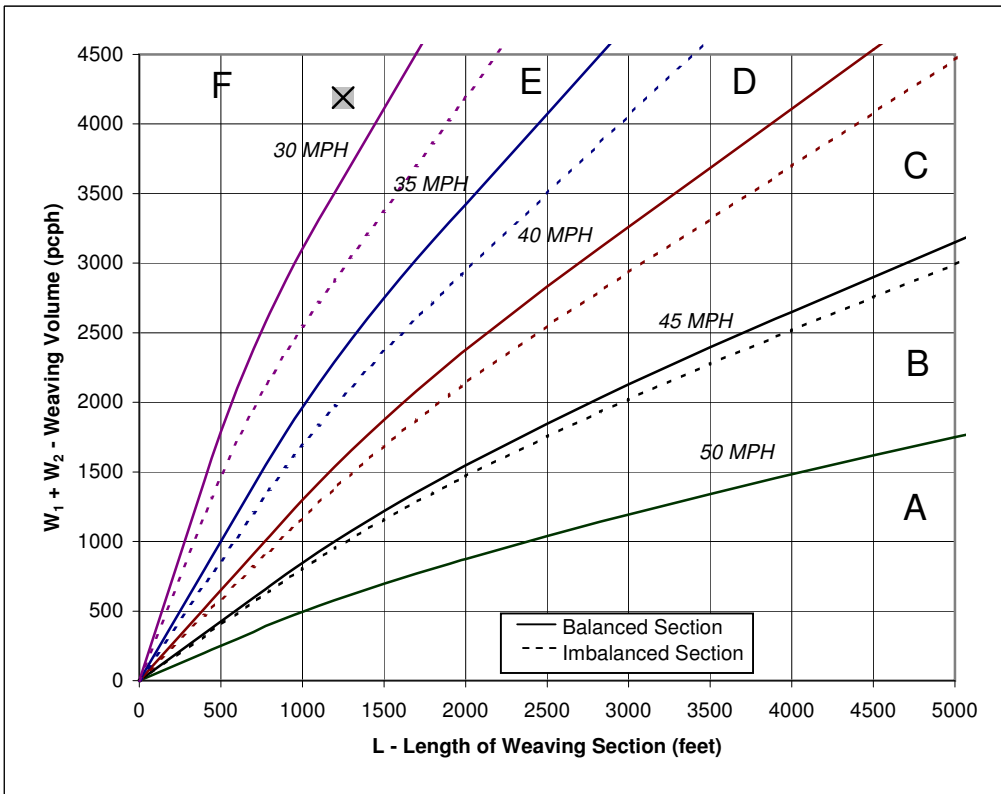
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

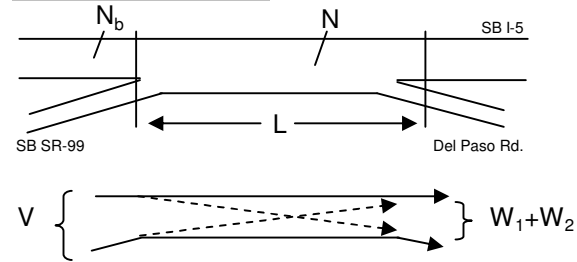
Project Information

Project	South Sutter County
Scenario	Cumulative PP NPP1 - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	7,130	Volume (vph)*	3,308	Volume (vph)*	780
Truck Percentage	12%	Truck Percentage	5%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	7,558	Volume (pcph)	3,391	Volume (pcph)	800



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? N
[If optional exit lane, then "Y". Otherwise "N".]
- 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 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) 17.3
- Weaving Intensity Factor (k) 3.00
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ 2,289
- Level of Service (LOS) F

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	8580	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	8580	4740
Lanes	3	2
Capacity Check	LOS F	LOS F

f_{HV}	0.9615
----------	--------

v_i	9199.175	pc/hr/ln
-------	----------	----------

Density, D	33.4	pc/mi/ln
-------------------	------	----------

LOS	LOS F
------------	-------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP1 NPP PM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



CUMULATIVE CONDITIONS
PLUS PROJECT
NO PLACER PARKWAY

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP AM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	10	10	10	10	10	10
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)	11	11	11	11	11	11	11	11	11	11	11	11
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	92	82	16	92	82	16	22			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92	82	16	92	82	16	22			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	864	798	1063	864	798	1063	1594			1594		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	33	33	33	33								
Volume Left	11	11	11	11								
Volume Right	11	11	11	11								
cSH	895	895	1594	1594								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	1								
Control Delay (s)	9.2	9.2	2.5	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	2.5	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization			13.3%			ICU Level of Service				A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project No PP AM

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
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	10	10	10	860	10	190	10	1170	900	440	2430	10
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)	11	11	11	935	11	207	11	1272	978	478	2641	11
RTOR Reduction (vph)	0	11	0	0	0	33	0	0	0	0	0	0
Lane Group Flow (vph)	11	11	0	935	11	174	11	1272	978	478	2641	11
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		pm+ov	Prot		Free	Prot		Free
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)	1.5	6.4		22.1	27.0	58.1	1.5	67.7	143.3	31.1	97.3	143.3
Effective Green, g (s)	1.5	6.4		22.1	27.0	58.1	1.5	67.7	143.3	31.1	97.3	143.3
Actuated g/C Ratio	0.01	0.04		0.15	0.19	0.41	0.01	0.47	1.00	0.22	0.68	1.00
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)	19	77		529	351	686	19	1364	1583	384	2270	1583
v/s Ratio Prot	0.01	0.01		c0.27	0.01	0.05	0.01	0.44		c0.27	c0.79	
v/s Ratio Perm						0.05			c0.62			0.01
v/c Ratio	0.58	0.15		1.77	0.03	0.25	0.58	0.93	0.62	1.24	1.16	0.01
Uniform Delay, d1	70.6	65.8		60.6	47.5	28.2	70.6	35.6	0.0	56.1	23.0	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.3	0.9		353.0	0.0	0.2	36.3	11.7	1.8	130.3	78.8	0.0
Delay (s)	106.9	66.7		413.6	47.5	28.4	106.9	47.3	1.8	186.4	101.8	0.0
Level of Service	F	E		F	D	C	F	D	A	F	F	A
Approach Delay (s)		80.1			341.0			27.9			114.4	
Approach LOS		F			F			C			F	































Intersection Summary

HCM Average Control Delay	124.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	143.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Sankey Rd & Road "H"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Volume (vph)	720	290	340	50	310	120	290	250	10	20	170	450
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)	783	315	370	54	337	130	315	272	11	22	185	489
RTOR Reduction (vph)	0	0	217	0	0	105	0	0	8	0	0	398
Lane Group Flow (vph)	783	315	153	54	337	25	315	272	3	22	185	91
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	20.3	30.4	30.4	3.8	13.9	13.9	9.8	21.8	21.8	1.7	13.7	13.7
Effective Green, g (s)	20.3	30.4	30.4	3.8	13.9	13.9	9.8	21.8	21.8	1.7	13.7	13.7
Actuated g/C Ratio	0.28	0.41	0.41	0.05	0.19	0.19	0.13	0.30	0.30	0.02	0.19	0.19
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)	946	1460	653	91	667	299	456	1047	468	41	658	294
v/s Ratio Prot	c0.23	0.09		0.03	c0.10		c0.09	0.08		0.01	0.05	
v/s Ratio Perm			0.10			0.02			0.00			c0.06
v/c Ratio	0.83	0.22	0.23	0.59	0.51	0.08	0.69	0.26	0.01	0.54	0.28	0.31
Uniform Delay, d1	25.1	14.0	14.1	34.2	26.8	24.6	30.5	19.8	18.3	35.6	25.8	25.9
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	6.0	0.1	0.2	10.0	0.6	0.1	4.5	0.1	0.0	12.8	0.2	0.6
Delay (s)	31.1	14.0	14.3	44.2	27.4	24.8	35.0	19.9	18.3	48.4	26.0	26.5
Level of Service	C	B	B	D	C	C	C	B	B	D	C	C
Approach Delay (s)		23.2			28.5			27.8			27.1	
Approach LOS		C			C			C			C	

Intersection Summary		
HCM Average Control Delay	25.7	HCM Level of Service C
HCM Volume to Capacity ratio	0.60	
Actuated Cycle Length (s)	73.7	Sum of lost time (s) 16.0
Intersection Capacity Utilization	55.4%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

































HCM Signalized Intersection Capacity Analysis
4: Riego Rd & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project No PP AM

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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.95		1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1748		1770	1770		1770	1624		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1748		1770	1770		1770	1624		1770	1723	
Volume (vph)	10	130	90	110	20	10	10	10	60	10	10	10
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)	11	141	98	120	22	11	11	11	65	11	11	11
RTOR Reduction (vph)	0	47	0	0	8	0	0	40	0	0	7	0
Lane Group Flow (vph)	11	192	0	120	25	0	11	36	0	11	15	0
Turn Type	Prot		Prot		Prot		Prot		Prot			
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.5	8.2		4.6	12.3		0.5	18.2		0.5	18.2	
Effective Green, g (s)	0.5	8.2		4.6	12.3		0.5	18.2		0.5	18.2	
Actuated g/C Ratio	0.01	0.17		0.10	0.26		0.01	0.38		0.01	0.38	
Clearance Time (s)	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	
Lane Grp Cap (vph)	19	302		171	458		19	622		19	660	
v/s Ratio Prot	0.01	c0.11		c0.07	0.01		c0.01	c0.02		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.58	0.64		0.70	0.05		0.58	0.06		0.58	0.02	
Uniform Delay, d1	23.4	18.3		20.8	13.2		23.4	9.2		23.4	9.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.3	4.3		12.3	0.0		36.3	0.0		36.3	0.0	
Delay (s)	59.7	22.6		33.0	13.3		59.7	9.3		59.7	9.1	
Level of Service	E	C		C	B		E	A		E	A	
Approach Delay (s)		24.2			28.8			15.7			26.0	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM Average Control Delay			24.2			HCM Level of Service		C				
HCM Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			47.5			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			35.7%			ICU Level of Service		A				
Analysis Period (min)			15									
c Critical Lane Group												



































HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project No PP AM

													
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583	
Volume (vph)	240	580	660	1290	1230	70	1790	1770	1470	130	2310	860	
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)	261	630	717	1402	1337	76	1946	1924	1598	141	2511	935	
RTOR Reduction (vph)	0	0	427	0	0	38	0	0	0	0	0	0	
Lane Group Flow (vph)	261	630	290	1402	1337	38	1946	1924	1598	141	2511	935	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%	
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8			Free			Free	
Actuated Green, G (s)	6.0	18.0	18.0	23.0	35.0	35.0	56.0	90.0	160.0	13.0	47.0	160.0	
Effective Green, g (s)	6.0	18.0	18.0	23.0	35.0	35.0	56.0	90.0	160.0	13.0	47.0	160.0	
Actuated g/C Ratio	0.04	0.11	0.11	0.14	0.22	0.22	0.35	0.56	1.00	0.08	0.29	1.00	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0		
Lane Grp Cap (vph)	129	572	178	493	1112	346	620	1625	1583	144	982	1583	
v/s Ratio Prot	0.08	0.12		c0.41	0.26		c1.10	0.67		0.08	c0.75		
v/s Ratio Perm			c0.18			0.02			1.01			0.59	
v/c Ratio	2.02	1.10	1.63	2.84	1.20	0.11	3.14	1.18	1.01	0.98	2.56	0.59	
Uniform Delay, d1	77.0	71.0	71.0	68.5	62.5	50.0	52.0	35.0	80.0	73.4	56.5	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	486.6	68.4	307.5	835.3	99.8	0.6	966.7	89.4	25.0	69.7	703.7	1.6	
Delay (s)	563.6	139.4	378.5	903.8	162.3	50.7	1018.7	124.4	105.0	143.0	760.2	1.6	
Level of Service	F	F	F	F	F	D	F	F	F	F	F	A	
Approach Delay (s)		314.9			528.6			437.0			538.2		
Approach LOS		F			F			F			F		
Intersection Summary													
HCM Average Control Delay			468.5									HCM Level of Service	F
HCM Volume to Capacity ratio			2.71										
Actuated Cycle Length (s)			160.0									Sum of lost time (s)	16.0
Intersection Capacity Utilization			224.4%									ICU Level of Service	H
Analysis Period (min)			15										
c Critical Lane Group													













HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	0.86	1.00	0.97	0.86	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	590	1110	10	50	2150	270	60	30	10	260	10	260
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)	641	1207	11	54	2337	293	65	33	11	283	11	283
RTOR Reduction (vph)	0	0	5	0	0	106	0	0	9	0	0	198
Lane Group Flow (vph)	641	1207	6	54	2337	187	65	33	2	283	11	85
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	30.0	87.0	87.0	4.0	61.0	61.0	4.7	28.4	28.4	24.3	48.0	48.0
Effective Green, g (s)	30.0	87.0	87.0	4.0	61.0	61.0	4.7	28.4	28.4	24.3	48.0	48.0
Actuated g/C Ratio	0.19	0.54	0.54	0.03	0.38	0.38	0.03	0.18	0.18	0.15	0.30	0.30
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)	645	3491	862	86	2448	605	101	629	282	522	1064	476
v/s Ratio Prot	c0.19	0.19		0.02	c0.36		0.02	0.01		c0.08	0.00	
v/s Ratio Perm			0.00			0.12			0.00			c0.05
v/c Ratio	0.99	0.35	0.01	0.63	0.95	0.31	0.64	0.05	0.01	0.54	0.01	0.18
Uniform Delay, d1	64.8	20.4	16.6	77.1	48.0	34.6	76.7	54.5	54.0	62.6	39.2	41.3
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	33.7	0.3	0.0	13.5	10.3	1.3	13.2	0.0	0.0	4.0	0.0	0.8
Delay (s)	98.4	20.7	16.6	90.6	58.3	35.9	89.9	54.5	54.1	66.6	39.2	42.1
Level of Service	F	C	B	F	E	D	F	D	D	E	D	D
Approach Delay (s)		47.5			56.5			75.6			54.0	
Approach LOS		D			E			E			D	
Intersection Summary												
HCM Average Control Delay			53.4	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			159.7	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			72.1%	ICU Level of Service				C				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	1020	10	0	2270	0	0	0	20	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1109	11	0	2467	0	0	0	22	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)												
pX, platoon unblocked												
vC, conflicting volume	2467			1120			1931	3576	370	2859	3587	822
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2467			1120			1931	3576	370	2859	3587	822
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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			100			100	100	97	100	100	100
cM capacity (veh/h)	185			620			40	5	628	7	5	317
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1				
Volume Total	370	370	370	11	822	822	822	22				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	11	0	0	0	22				
cSH	1700	1700	1700	1700	1700	1700	1700	628				
Volume to Capacity	0.22	0.22	0.22	0.01	0.48	0.48	0.48	0.03				
Queue Length 95th (ft)	0	0	0	0	0	0	0	3				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9				
Lane LOS								B				
Approach Delay (s)	0.0				0.0			10.9				
Approach LOS								B				
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			47.2%		ICU Level of Service			A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Cumulative Plus Project No PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	↘
Sign Control		Stop	Stop		Stop	
Volume (vph)	50	990	2120	100	100	150
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	54	1076	2304	109	109	163
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	1130	2304	109	272		
Volume Left (vph)	54	0	0	109		
Volume Right (vph)	0	0	109	163		
Hadj (s)	0.04	0.03	-0.67	-0.25		
Departure Headway (s)	6.0	6.4	5.7	6.7		
Degree Utilization, x	1.89	4.07	0.17	0.51		
Capacity (veh/h)	604	574	629	531		
Control Delay (s)	420.9	1396.7	8.6	16.4		
Approach Delay (s)	420.9	1334.2		16.4		
Approach LOS	F	F		C		
Intersection Summary						
Delay			969.7			
HCM Level of Service			F			
Intersection Capacity Utilization			133.0%		ICU Level of Service	H
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	↗
Sign Control	Stop			Stop	Stop	
Volume (vph)	860	230	100	1260	960	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	935	250	109	1370	1043	22
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	935	250	1478	1065		
Volume Left (vph)	0	0	109	1043		
Volume Right (vph)	0	250	0	22		
Hadj (s)	0.03	-0.67	0.05	0.22		
Departure Headway (s)	7.6	6.9	7.1	7.2		
Degree Utilization, x	1.98	0.48	2.92	2.13		
Capacity (veh/h)	480	516	510	510		
Control Delay (s)	464.4	15.0	885.9	530.2		
Approach Delay (s)	369.5		885.9	530.2		
Approach LOS	F		F	F		
Intersection Summary						
Delay			620.2			
HCM Level of Service			F			
Intersection Capacity Utilization			181.5%	ICU Level of Service	H	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	830	40	90	1270	550	80	40	50	50	10	10
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)	11	902	43	98	1380	598	87	43	54	54	11	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	957	2076	185	76								
Volume Left (vph)	11	98	87	54								
Volume Right (vph)	43	598	54	11								
Hadj (s)	0.01	-0.13	-0.05	0.09								
Departure Headway (s)	6.0	5.8	7.4	8.0								
Degree Utilization, x	1.59	3.37	0.38	0.17								
Capacity (veh/h)	595	622	479	426								
Control Delay (s)	288.7	1081.9	14.8	12.7								
Approach Delay (s)	288.7	1081.9	14.8	12.7								
Approach LOS	F	F	B	B								
Intersection Summary												
Delay			766.9									
HCM Level of Service			F									
Intersection Capacity Utilization			171.8%	ICU Level of Service	H							
Analysis Period (min)			15									





































HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

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	0.91	1.00	1.00	0.91	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	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	830	50	250	1730	40	120	60	210	160	50	10
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)	11	902	54	272	1880	43	130	65	228	174	54	11
RTOR Reduction (vph)	0	0	40	0	0	18	0	0	201	0	0	10
Lane Group Flow (vph)	11	902	14	272	1880	25	130	65	27	174	54	1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	0.7	27.4	27.4	17.2	43.9	43.9	31.5	12.3	12.3	29.3	10.1	10.1
Effective Green, g (s)	0.7	27.4	27.4	17.2	43.9	43.9	31.5	12.3	12.3	29.3	10.1	10.1
Actuated g/C Ratio	0.01	0.27	0.27	0.17	0.43	0.43	0.31	0.12	0.12	0.29	0.10	0.10
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)	12	1363	424	298	2184	680	546	224	191	507	184	156
v/s Ratio Prot	0.01	0.18		c0.15	c0.37		0.07	c0.03		c0.10	0.03	
v/s Ratio Perm			0.01			0.02			0.02			0.00
v/c Ratio	0.92	0.66	0.03	0.91	0.86	0.04	0.24	0.29	0.14	0.34	0.29	0.01
Uniform Delay, d1	50.7	33.3	27.6	41.8	26.4	16.9	26.4	41.0	40.2	28.8	42.7	41.5
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	212.2	1.2	0.0	30.5	4.7	0.1	1.0	0.7	0.3	1.8	0.9	0.0
Delay (s)	262.9	34.5	27.7	72.2	31.1	17.0	27.4	41.7	40.6	30.7	43.6	41.5
Level of Service	F	C	C	E	C	B	C	D	D	C	D	D
Approach Delay (s)		36.7			35.9			36.7			34.1	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM Average Control Delay			36.1				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			102.2				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			62.3%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												































HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	780	1320	120	680	1680	10	130	970	610	30	930	1030
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)	848	1435	130	739	1826	11	141	1054	663	33	1011	1120
RTOR Reduction (vph)	0	0	51	0	0	5	0	0	259	0	0	256
Lane Group Flow (vph)	848	1435	79	739	1826	6	141	1054	404	33	1011	864
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	26.0	39.9	39.9	29.5	43.0	43.0	5.0	55.3	55.3	3.2	53.5	53.5
Effective Green, g (s)	26.0	41.9	41.9	29.1	45.0	45.0	5.0	55.6	55.6	3.2	53.8	53.8
Actuated g/C Ratio	0.18	0.29	0.29	0.20	0.31	0.31	0.03	0.38	0.38	0.02	0.37	0.37
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.3
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	612	1461	455	685	1569	489	118	1939	604	75	1876	584
v/s Ratio Prot	c0.25	0.28		0.22	c0.36		c0.04	0.21		0.01	0.20	
v/s Ratio Perm			0.05			0.00			0.26			c0.55
v/c Ratio	1.39	0.98	0.17	1.08	1.16	0.01	1.19	0.54	0.67	0.44	0.54	1.48
Uniform Delay, d1	59.9	51.6	39.0	58.4	50.4	35.0	70.4	35.2	37.4	70.4	36.2	46.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	183.5	19.3	0.1	57.6	81.1	0.0	144.5	0.2	2.2	4.1	0.2	224.7
Delay (s)	243.4	70.8	39.0	116.0	131.5	35.0	214.9	35.4	39.6	74.5	36.4	270.7
Level of Service	F	E	D	F	F	C	F	D	D	E	D	F
Approach Delay (s)	129.8			126.6			50.5			158.3		
Approach LOS	F			F			D			F		
Intersection Summary												
HCM Average Control Delay	119.4			HCM Level of Service			F					
HCM Volume to Capacity ratio	1.34											
Actuated Cycle Length (s)	145.8			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	109.9%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	310	960	40	270	1150	410	10	1220	280	340	870	640
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)	337	1043	43	293	1250	446	11	1326	304	370	946	696
RTOR Reduction (vph)	0	0	31	0	0	112	0	0	140	0	0	152
Lane Group Flow (vph)	337	1043	12	293	1250	334	11	1326	164	370	946	544
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	11.0	30.0	30.0	10.0	29.0	29.0	0.6	46.2	46.2	12.0	57.6	57.6
Effective Green, g (s)	11.0	32.0	32.0	10.0	31.0	31.0	0.6	48.2	48.2	12.0	59.6	59.6
Actuated g/C Ratio	0.09	0.27	0.27	0.08	0.26	0.26	0.01	0.41	0.41	0.10	0.50	0.50
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	319	1377	429	290	1334	415	17	1443	646	349	1784	798
v/s Ratio Prot	c0.10	0.21		0.09	c0.25		0.00	c0.37		c0.11	0.27	
v/s Ratio Perm			0.01			0.21			0.10			0.34
v/c Ratio	1.06	0.76	0.03	1.01	0.94	0.80	0.65	0.92	0.25	1.06	0.53	0.68
Uniform Delay, d1	53.6	39.5	31.7	54.1	42.6	40.8	58.7	33.1	23.1	53.1	19.8	22.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	66.0	2.8	0.1	55.5	12.8	12.1	49.2	10.0	0.4	65.0	0.5	3.0
Delay (s)	119.6	42.4	31.7	109.6	55.4	52.9	107.9	43.2	23.5	118.1	20.4	25.1
Level of Service	F	D	C	F	E	D	F	D	C	F	C	C
Approach Delay (s)		60.4			62.8			40.0			40.0	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM Average Control Delay			50.5			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			118.2	Sum of lost time (s)			16.0					
Intersection Capacity Utilization			87.8%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	50	20	10	30	70	280	20	80	10	290	40	20
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)	54	22	11	33	76	304	22	87	11	315	43	22
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	87	413	120	380								
Volume Left (vph)	54	33	22	315								
Volume Right (vph)	11	304	11	22								
Hadj (s)	0.08	-0.39	0.02	0.17								
Departure Headway (s)	6.2	5.2	6.0	5.7								
Degree Utilization, x	0.15	0.59	0.20	0.60								
Capacity (veh/h)	491	660	521	602								
Control Delay (s)	10.3	15.3	10.5	16.8								
Approach Delay (s)	10.3	15.3	10.5	16.8								
Approach LOS	B	C	B	C								
Intersection Summary												
Delay			14.9									
HCM Level of Service			B									
Intersection Capacity Utilization			55.0%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

												
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	410	10	0	1050	700	0	0	210	0	0	70
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	446	11	0	1141	761	0	0	228	0	0	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.26						0.26	0.26		0.26	0.26	0.26
vC, conflicting volume	1902			457			2049	2353	451	2201	1978	1522
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4463			457			5026	6194	451	5610	4755	3003
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			100			0	100	62	100	100	0
cM capacity (veh/h)	8			1104			0	0	608	0	0	5
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	457	1902	228	76								
Volume Left	0	0	0	0								
Volume Right	11	761	228	76								
cSH	1700	1700	608	5								
Volume to Capacity	0.27	1.12	0.38	16.32								
Queue Length 95th (ft)	0	0	43	Err								
Control Delay (s)	0.0	0.0	14.4	Err								
Lane LOS			B	F								
Approach Delay (s)	0.0	0.0	14.4	Err								
Approach LOS			B	F								
Intersection Summary												
Average Delay			286.9									
Intersection Capacity Utilization			109.0%		ICU Level of Service				G			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP AM



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	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	1863	1583	1730	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	1863	1583	1730	
Volume (vph)	80	540	1680	10	180	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	587	1826	11	196	76
RTOR Reduction (vph)	0	0	0	2	10	0
Lane Group Flow (vph)	87	587	1826	9	262	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		4	
Permitted Phases				6		
Actuated Green, G (s)	6.0	122.0	112.0	112.0	20.0	
Effective Green, g (s)	6.0	122.0	112.0	112.0	20.0	
Actuated g/C Ratio	0.04	0.81	0.75	0.75	0.13	
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)	71	2878	1391	1182	231	
v/s Ratio Prot	c0.05	0.17	c0.98		c0.15	
v/s Ratio Perm				0.01		
v/c Ratio	1.23	0.20	1.31	0.01	1.14	
Uniform Delay, d1	72.0	3.1	19.0	4.8	65.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	179.4	0.0	146.0	0.0	100.8	
Delay (s)	251.4	3.2	165.0	4.8	165.8	
Level of Service	F	A	F	A	F	
Approach Delay (s)		35.2	164.0		165.8	
Approach LOS		D	F		F	

Intersection Summary

HCM Average Control Delay	133.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP AM


































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	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)	300	860	1440	190	250	460
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	935	1565	207	272	500
RTOR Reduction (vph)	0	0	0	111	0	240
Lane Group Flow (vph)	326	935	1565	97	272	260
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	16.0	59.0	39.0	39.0	23.0	23.0
Effective Green, g (s)	16.0	59.0	39.0	39.0	23.0	23.0
Actuated g/C Ratio	0.18	0.66	0.43	0.43	0.26	0.26
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)	315	2320	1534	686	452	405
v/s Ratio Prot	c0.18	0.26	c0.44		0.15	
v/s Ratio Perm				0.06		c0.16
v/c Ratio	1.03	0.40	1.02	0.14	0.60	0.64
Uniform Delay, d1	37.0	7.3	25.5	15.4	29.5	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	60.0	0.1	28.2	0.4	5.8	7.6
Delay (s)	97.0	7.4	53.7	15.8	35.3	37.4
Level of Service	F	A	D	B	D	D
Approach Delay (s)		30.6	49.3		36.7	
Approach LOS		C	D		D	

Intersection Summary

HCM Average Control Delay	40.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

Sutter Pointe EIR
 Cumulative Plus Project No PP AM



































												
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	240	730	240	170	1140	200	290	290	90	150	370	150
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)	261	793	261	185	1239	217	315	315	98	163	402	163
RTOR Reduction (vph)	0	0	164	0	0	133	0	0	72	0	0	121
Lane Group Flow (vph)	261	793	97	185	1239	84	315	315	26	163	402	42
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	7.0	33.3	33.3	8.7	35.0	35.0	9.0	24.2	24.2	7.8	23.0	23.0
Effective Green, g (s)	7.0	33.3	33.3	8.7	35.0	35.0	9.0	24.2	24.2	7.8	23.0	23.0
Actuated g/C Ratio	0.08	0.37	0.37	0.10	0.39	0.39	0.10	0.27	0.27	0.09	0.26	0.26
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)	267	1309	586	332	1376	616	343	952	426	298	904	405
v/s Ratio Prot	c0.08	0.22		0.05	c0.35		c0.09	0.09		0.05	c0.11	
v/s Ratio Perm			0.06			0.05			0.02			0.03
v/c Ratio	0.98	0.61	0.16	0.56	0.90	0.14	0.92	0.33	0.06	0.55	0.44	0.10
Uniform Delay, d1	41.4	23.0	19.0	38.8	25.9	17.8	40.1	26.4	24.5	39.4	28.1	25.6
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	48.3	2.1	0.6	2.0	9.7	0.5	28.5	0.9	0.3	2.1	1.6	0.5
Delay (s)	89.7	25.1	19.6	40.8	35.6	18.2	68.6	27.3	24.7	41.5	29.7	26.1
Level of Service	F	C	B	D	D	B	E	C	C	D	C	C
Approach Delay (s)		36.8			33.9			44.8			31.5	
Approach LOS		D			C			D			C	

Intersection Summary

HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			













HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	800	320	480	410	810	420	750	1150	100	210	1350	790
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)	870	348	522	446	880	457	815	1250	109	228	1467	859
RTOR Reduction (vph)	0	0	183	0	0	154	0	0	63	0	0	222
Lane Group Flow (vph)	870	348	339	446	880	303	815	1250	46	228	1467	637
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	25.5	37.9	37.9	18.3	31.0	31.0	23.5	54.1	54.1	12.3	42.9	42.9
Effective Green, g (s)	27.0	39.6	39.6	19.8	32.4	32.4	25.0	55.8	55.8	13.8	44.6	44.6
Actuated g/C Ratio	0.19	0.27	0.27	0.14	0.22	0.22	0.17	0.38	0.38	0.10	0.31	0.31
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	639	1389	432	469	1136	354	592	1957	609	327	1564	487
v/s Ratio Prot	c0.25	0.07		0.13	0.17		c0.24	0.25		0.07	0.29	
v/s Ratio Perm			0.21			c0.19			0.03			c0.40
v/c Ratio	1.36	0.25	0.78	0.95	0.77	0.86	1.38	0.64	0.07	0.70	0.94	1.31
Uniform Delay, d1	59.0	41.1	48.7	62.1	52.9	54.1	60.0	36.4	28.3	63.6	48.9	50.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	172.7	0.3	11.0	29.2	3.9	19.6	180.0	1.0	0.1	5.2	11.6	153.2
Delay (s)	231.7	41.4	59.8	91.3	56.8	73.6	240.0	37.4	28.4	68.7	60.4	203.4
Level of Service	F	D	E	F	E	E	F	D	C	E	E	F
Approach Delay (s)	142.0		69.7		112.9		109.3					
Approach LOS	F		E		F		F					
Intersection Summary												
HCM Average Control Delay	108.6		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.22											
Actuated Cycle Length (s)	145.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	99.3%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

													
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	
Lane Util. Factor		0.91	1.00		0.95	1.00				0.97		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		5085	1583		3539	1583				3433		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		5085	1583		3539	1583				3433		1583	
Volume (vph)	0	490	170	0	700	980	0	0	0	340	0	230	
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	533	185	0	761	1065	0	0	0	370	0	250	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	79	
Lane Group Flow (vph)	0	533	185	0	761	1065	0	0	0	370	0	171	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		24.5	44.3		24.5	44.3				11.8		11.8	
Effective Green, g (s)		24.5	44.3		24.5	44.3				11.8		11.8	
Actuated g/C Ratio		0.55	1.00		0.55	1.00				0.27		0.27	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2812	1583		1957	1583				914		422	
v/s Ratio Prot		0.10			0.22					0.11			
v/s Ratio Perm			0.12			0.67						0.11	
v/c Ratio		0.19	0.12		0.39	0.67				0.40		0.40	
Uniform Delay, d1		4.9	0.0		5.6	0.0				13.4		13.4	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.2		0.6	2.3				0.3		0.6	
Delay (s)		5.0	0.2		6.2	2.3				13.7		14.0	
Level of Service		A	A		A	A				B		B	
Approach Delay (s)		3.7			3.9			0.0			13.8		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			5.8									HCM Level of Service	A
HCM Volume to Capacity ratio			0.67										
Actuated Cycle Length (s)			44.3									Sum of lost time (s)	0.0
Intersection Capacity Utilization			40.3%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													













HCM Signalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

													
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		0.95	1.00		0.91	1.00	0.97		1.00				
Frt		1.00	0.85		1.00	0.85	1.00		0.85				
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00				
Satd. Flow (prot)		3539	1583		5085	1583	3433		1583				
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00				
Satd. Flow (perm)		3539	1583		5085	1583	3433		1583				
Volume (vph)	0	600	230	0	1550	720	130	0	450	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)	0	652	250	0	1685	783	141	0	489	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	652	250	0	1685	783	141	0	489	0	0	0	
Turn Type			Free			Free	Prot		Free				
Protected Phases		2			6		4						
Permitted Phases			Free			Free			Free				
Actuated Green, G (s)		42.7	61.9		42.7	61.9	11.2		61.9				
Effective Green, g (s)		42.7	61.9		42.7	61.9	11.2		61.9				
Actuated g/C Ratio		0.69	1.00		0.69	1.00	0.18		1.00				
Clearance Time (s)		4.0			4.0		4.0						
Vehicle Extension (s)		3.0			3.0		3.0						
Lane Grp Cap (vph)		2441	1583		3508	1583	621		1583				
v/s Ratio Prot		0.18			0.33		0.04						
v/s Ratio Perm			0.16			0.49			0.31				
v/c Ratio		0.27	0.16		0.48	0.49	0.23		0.31				
Uniform Delay, d1		3.7	0.0		4.5	0.0	21.7		0.0				
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00				
Incremental Delay, d2		0.3	0.2		0.1	1.1	0.2		0.5				
Delay (s)		3.9	0.2		4.6	1.1	21.8		0.5				
Level of Service		A	A		A	A	C		A				
Approach Delay (s)		2.9			3.5			5.3			0.0		
Approach LOS		A			A			A			A		
Intersection Summary													
HCM Average Control Delay			3.6									HCM Level of Service	A
HCM Volume to Capacity ratio			0.49										
Actuated Cycle Length (s)			61.9									Sum of lost time (s)	0.0
Intersection Capacity Utilization			40.3%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													























HCM Signalized Intersection Capacity Analysis
23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.91		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	5085		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		5085	1583	1770	5085		1770		1583			
Volume (vph)	0	600	120	750	1510	0	200	0	490	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)	0	652	130	815	1641	0	217	0	533	0	0	0
RTOR Reduction (vph)	0	0	106	0	0	0	0	0	442	0	0	0
Lane Group Flow (vph)	0	652	24	815	1641	0	217	0	91	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		16.4	16.4	49.5	69.4		16.7		16.7			
Effective Green, g (s)		17.9	17.9	49.0	70.9		16.2		16.2			
Actuated g/C Ratio		0.19	0.19	0.52	0.75		0.17		0.17			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		957	298	912	3791		302		270			
v/s Ratio Prot		c0.13		c0.46	0.32		c0.12					
v/s Ratio Perm			0.02						0.06			
v/c Ratio		0.68	0.08	0.89	0.43		0.72		0.34			
Uniform Delay, d1		35.9	31.8	20.7	4.5		37.3		34.7			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		2.0	0.1	10.8	0.1		6.7		0.3			
Delay (s)		38.0	31.9	31.6	4.6		43.9		35.0			
Level of Service		D	C	C	A		D		C			
Approach Delay (s)		37.0			13.6			37.6			0.0	
Approach LOS		D			B			D			A	
Intersection Summary												
HCM Average Control Delay			22.7				HCM Level of Service		C			
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			95.1				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			74.2%				ICU Level of Service		D			
Analysis Period (min)			15									
c	Critical Lane Group											























HCM Signalized Intersection Capacity Analysis
24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
Cumulative Plus Project No PP AM

													
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	
Lane Util. Factor	1.00	0.91			0.91	1.00				1.00	1.00	1.00	
Frt	1.00	1.00			1.00	0.85				1.00	1.00	0.85	
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00	
Satd. Flow (prot)	1770	5085			5085	1583				1770	1583	1583	
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00	
Satd. Flow (perm)	1770	5085			5085	1583				1770	1583	1583	
Volume (vph)	180	1070	0	0	2010	20	0	0	0	30	0	130	
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)	196	1163	0	0	2185	22	0	0	0	33	0	141	
RTOR Reduction (vph)	0	0	0	0	0	10	0	0	0	0	0	126	
Lane Group Flow (vph)	196	1163	0	0	2185	12	0	0	0	33	0	15	
Turn Type	Prot			Perm						Prot		custom	
Protected Phases	5	2			6					8			
Permitted Phases						6						8	
Actuated Green, G (s)	9.8	51.0			37.2	37.2				7.2		7.2	
Effective Green, g (s)	9.8	51.0			37.2	37.2				7.2		7.2	
Actuated g/C Ratio	0.15	0.77			0.56	0.56				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)	262	3917			2857	890				193		172	
v/s Ratio Prot	c0.11	0.23			c0.43					c0.02			
v/s Ratio Perm						0.01						0.01	
v/c Ratio	0.75	0.30			0.76	0.01				0.17		0.09	
Uniform Delay, d1	27.0	2.3			11.1	6.4				26.8		26.5	
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00	
Incremental Delay, d2	11.1	0.0			1.3	0.0				0.4		0.2	
Delay (s)	38.1	2.3			12.4	6.4				27.2		26.8	
Level of Service	D	A			B	A				C		C	
Approach Delay (s)		7.5			12.3			0.0			26.9		
Approach LOS		A			B			A			C		
Intersection Summary													
HCM Average Control Delay			11.2				HCM Level of Service			B			
HCM Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			66.2				Sum of lost time (s)		12.0				
Intersection Capacity Utilization			62.1%				ICU Level of Service		B				
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Road "O" & Road "H"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.93		1.00	0.93		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1723		1770	1863	1583	1770	1854	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1723		1770	1723		1770	1863	1583	1770	1854	
Volume (vph)	10	10	10	160	10	10	10	570	40	10	300	10
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)	11	11	11	174	11	11	11	620	43	11	326	11
RTOR Reduction (vph)	0	11	0	0	9	0	0	0	21	0	1	0
Lane Group Flow (vph)	11	11	0	174	13	0	11	620	22	11	336	0
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	0.6	2.6		9.7	11.7		0.6	30.9	30.9	0.6	30.9	
Effective Green, g (s)	0.6	2.6		9.7	11.7		0.6	30.9	30.9	0.6	30.9	
Actuated g/C Ratio	0.01	0.04		0.16	0.20		0.01	0.52	0.52	0.01	0.52	
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)	18	75		287	337		18	963	818	18	958	
v/s Ratio Prot	0.01	c0.01		c0.10	0.01		c0.01	c0.33		0.01	0.18	
v/s Ratio Perm									0.01			
v/c Ratio	0.61	0.15		0.61	0.04		0.61	0.64	0.03	0.61	0.35	
Uniform Delay, d1	29.5	27.5		23.3	19.5		29.5	10.5	7.1	29.5	8.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	48.7	1.0		3.6	0.0		48.7	1.5	0.0	48.7	0.2	
Delay (s)	78.2	28.5		26.9	19.5		78.2	12.0	7.1	78.2	8.7	
Level of Service	E	C		C	B		E	B	A	E	A	
Approach Delay (s)		45.1			26.0			12.7			10.9	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM Average Control Delay			15.2			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			59.8			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			52.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												





























HCM Signalized Intersection Capacity Analysis
26: Road "O" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1800		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1800		1770	3539	1583	1770	3539	1583
Volume (vph)	10	30	160	360	70	20	560	310	230	10	150	90
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)	11	33	174	391	76	22	609	337	250	11	163	98
RTOR Reduction (vph)	0	0	154	0	8	0	0	0	136	0	0	88
Lane Group Flow (vph)	11	33	20	391	90	0	609	337	114	11	163	10
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	0.7	13.1	13.1	28.2	40.6		44.3	51.3	51.3	4.0	11.0	11.0
Effective Green, g (s)	0.7	13.1	13.1	28.2	40.6		44.3	51.3	51.3	4.0	11.0	11.0
Actuated g/C Ratio	0.01	0.12	0.12	0.25	0.36		0.39	0.46	0.46	0.04	0.10	0.10
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)	11	217	184	443	649		696	1612	721	63	346	155
v/s Ratio Prot	0.01	0.02		c0.22	c0.05		c0.34	0.10		0.01	c0.05	
v/s Ratio Perm			0.01						0.07			0.01
v/c Ratio	1.00	0.15	0.11	0.88	0.14		0.88	0.21	0.16	0.17	0.47	0.06
Uniform Delay, d1	55.9	44.8	44.5	40.6	24.2		31.6	18.4	18.0	52.7	48.0	46.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	271.4	0.3	0.3	18.3	0.1		11.8	0.1	0.1	1.3	1.0	0.2
Delay (s)	327.3	45.1	44.8	58.9	24.3		43.4	18.5	18.1	54.0	49.1	46.3
Level of Service	F	D	D	E	C		D	B	B	D	D	D
Approach Delay (s)		59.1			52.0			31.1			48.3	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM Average Control Delay			40.8				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			112.6				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			71.8%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
29: Road "K" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Volume (vph)	130	70	150	150	100	200	320	510	200	150	380	460
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)	141	76	163	163	109	217	348	554	217	163	413	500
RTOR Reduction (vph)	0	0	141	0	0	183	0	0	116	0	0	268
Lane Group Flow (vph)	141	76	22	163	109	34	348	554	101	163	413	232
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	3.9	9.1	9.1	5.2	10.4	10.4	5.1	30.7	30.7	5.1	30.7	30.7
Effective Green, g (s)	3.9	9.1	9.1	5.2	10.4	10.4	5.1	30.7	30.7	5.1	30.7	30.7
Actuated g/C Ratio	0.06	0.14	0.14	0.08	0.16	0.16	0.08	0.46	0.46	0.08	0.46	0.46
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)	203	487	218	139	557	249	265	1644	735	137	1644	735
v/s Ratio Prot	0.04	0.02		c0.09	c0.03		c0.10	c0.16		0.09	0.12	
v/s Ratio Perm			0.01			0.02			0.06			0.15
v/c Ratio	0.69	0.16	0.10	1.17	0.20	0.14	1.31	0.34	0.14	1.19	0.25	0.32
Uniform Delay, d1	30.5	25.1	24.9	30.4	24.2	24.0	30.5	11.2	10.1	30.5	10.7	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.9	0.2	0.2	130.2	0.2	0.3	165.2	0.6	0.4	136.8	0.4	1.1
Delay (s)	40.4	25.3	25.1	160.6	24.4	24.2	195.7	11.8	10.5	167.3	11.1	12.2
Level of Service	D	C	C	F	C	C	F	B	B	F	B	B
Approach Delay (s)		30.8			69.7			68.7			35.3	
Approach LOS		C			E			E			D	

Intersection Summary

HCM Average Control Delay	52.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Road "J" & Road "H"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

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	0.95	1.00	1.00	0.95	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	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	170	240	50	50	120	210	20	120	40	180	120	70
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)	185	261	54	54	130	228	22	130	43	196	130	76
RTOR Reduction (vph)	0	0	31	0	0	150	0	0	36	0	0	54
Lane Group Flow (vph)	185	261	23	54	130	78	22	130	7	196	130	22
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	9.1	29.3	29.3	3.5	23.7	23.7	0.6	11.4	11.4	9.1	19.9	19.9
Effective Green, g (s)	9.1	29.3	29.3	3.5	23.7	23.7	0.6	11.4	11.4	9.1	19.9	19.9
Actuated g/C Ratio	0.13	0.42	0.42	0.05	0.34	0.34	0.01	0.16	0.16	0.13	0.29	0.29
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)	232	788	669	89	637	541	15	582	260	232	1016	455
v/s Ratio Prot	c0.10	c0.14		0.03	0.07		0.01	c0.04		c0.11	0.04	
v/s Ratio Perm			0.01			0.05			0.00			0.01
v/c Ratio	0.80	0.33	0.03	0.61	0.20	0.14	1.47	0.22	0.03	0.84	0.13	0.05
Uniform Delay, d1	29.2	13.4	11.7	32.2	16.1	15.8	34.4	25.1	24.3	29.4	18.3	17.9
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	17.1	1.1	0.1	11.2	0.7	0.6	405.4	0.2	0.0	23.5	0.1	0.0
Delay (s)	46.3	14.6	11.8	43.4	16.9	16.3	439.7	25.3	24.3	52.9	18.3	17.9
Level of Service	D	B	B	D	B	B	F	C	C	D	B	B
Approach Delay (s)		26.0			20.0			71.8			35.1	
Approach LOS		C			C			E			D	

Intersection Summary		
HCM Average Control Delay	32.7	HCM Level of Service C
HCM Volume to Capacity ratio	0.46	
Actuated Cycle Length (s)	69.3	Sum of lost time (s) 12.0
Intersection Capacity Utilization	42.6%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		














HCM Unsignalized Intersection Capacity Analysis
31: Road "J" & Road "L"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	330	50	60	160	40	140
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	359	54	65	174	43	152
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			413		663	359
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			413		663	359
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		89	78
cM capacity (veh/h)			1146		402	686
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	359	54	65	174	43	152
Volume Left	0	0	65	0	43	0
Volume Right	0	54	0	0	0	152
cSH	1700	1700	1146	1700	402	686
Volume to Capacity	0.21	0.03	0.06	0.10	0.11	0.22
Queue Length 95th (ft)	0	0	5	0	9	21
Control Delay (s)	0.0	0.0	8.3	0.0	15.0	11.7
Lane LOS			A		C	B
Approach Delay (s)	0.0		2.3		12.5	
Approach LOS					B	
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			34.0%	ICU Level of Service	A	
Analysis Period (min)			15			




















HCM Signalized Intersection Capacity Analysis
32: Road "M" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3533		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3533		1770	3539
Volume (vph)	10	100	870	10	40	680
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	109	946	11	43	739
RTOR Reduction (vph)	0	95	1	0	0	0
Lane Group Flow (vph)	11	14	956	0	43	739
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	8.8	8.8	43.1		2.4	49.5
Effective Green, g (s)	8.8	8.8	43.1		2.4	49.5
Actuated g/C Ratio	0.13	0.13	0.65		0.04	0.75
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)	235	210	2297		64	2642
v/s Ratio Prot	0.01		c0.27		c0.02	0.21
v/s Ratio Perm		c0.01				
v/c Ratio	0.05	0.07	0.42		0.67	0.28
Uniform Delay, d1	25.1	25.2	5.6		31.6	2.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.1	0.6		24.3	0.3
Delay (s)	25.2	25.3	6.1		55.9	3.0
Level of Service	C	C	A		E	A
Approach Delay (s)	25.3		6.1			5.9
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			7.3		HCM Level of Service	A
HCM Volume to Capacity ratio			0.37			
Actuated Cycle Length (s)			66.3		Sum of lost time (s)	12.0
Intersection Capacity Utilization			41.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
33: Road "M" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

													
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)	10	10	40	10	10	10	100	10	10	10	10	10	
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)	11	11	43	11	11	11	109	11	11	11	11	11	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None			None			
Median storage veh													
Upstream signal (ft)	1190												
pX, platoon unblocked													
vC, conflicting volume	22			54			87	76	11	87	114	16	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	22			54			87	76	11	87	114	16	
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 %	99			99			88	99	99	99	99	99	
cM capacity (veh/h)	1594			1551			871	803	1070	871	765	1063	
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1							
Volume Total	22	43	33	109	22	33							
Volume Left	11	0	11	109	0	11							
Volume Right	0	43	11	0	11	11							
cSH	1594	1700	1551	871	918	884							
Volume to Capacity	0.01	0.03	0.01	0.12	0.02	0.04							
Queue Length 95th (ft)	1	0	1	11	2	3							
Control Delay (s)	3.7	0.0	2.5	9.7	9.0	9.2							
Lane LOS	A		A	A	A	A							
Approach Delay (s)	1.2		2.5	9.6		9.2							
Approach LOS				A		A							
Intersection Summary													
Average Delay			6.6										
Intersection Capacity Utilization			27.2%		ICU Level of Service			A					
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis
 34: Road "M" & Road "G"















Sutter Pointe EIR
 Cumulative Plus Project No PP AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↑	↓	↔
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	10	10	30	20	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	11	33	22	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	82	27	33			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	82	27	33			
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)	914	1048	1579			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	22	43	33			
Volume Left	11	11	0			
Volume Right	11	0	11			
cSH	977	1579	1700			
Volume to Capacity	0.02	0.01	0.02			
Queue Length 95th (ft)	2	1	0			
Control Delay (s)	8.8	1.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	1.9	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			18.8%	ICU Level of Service	A	
Analysis Period (min)			15			























HCM Signalized Intersection Capacity Analysis
35: Road "D" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	280	520	340	140	410	270
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	565	370	152	446	293
RTOR Reduction (vph)	0	432	0	105	0	0
Lane Group Flow (vph)	304	133	370	47	446	293
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	19.8	19.8	26.1	26.1	26.1	56.2
Effective Green, g (s)	19.8	19.8	26.1	26.1	26.1	56.2
Actuated g/C Ratio	0.24	0.24	0.31	0.31	0.31	0.67
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)	417	373	1100	492	550	2368
v/s Ratio Prot	c0.17		c0.10		c0.25	0.08
v/s Ratio Perm		0.08		0.03		
v/c Ratio	0.73	0.36	0.34	0.10	0.81	0.12
Uniform Delay, d1	29.6	26.8	22.3	20.6	26.7	5.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.3	0.6	0.8	0.4	12.3	0.1
Delay (s)	35.9	27.4	23.1	21.0	38.9	5.1
Level of Service	D	C	C	C	D	A
Approach Delay (s)	30.4		22.5			25.5
Approach LOS	C		C			C
Intersection Summary						
HCM Average Control Delay			26.8		HCM Level of Service	C
HCM Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			84.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			57.6%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
36: Road "D" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1856		1770	1863	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1856		1770	1863	1583	1770	1723		1770	1863	1583
Volume (vph)	130	420	10	10	530	60	10	10	10	90	10	290
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)	141	457	11	11	576	65	11	11	11	98	11	315
RTOR Reduction (vph)	0	1	0	0	0	36	0	10	0	0	0	265
Lane Group Flow (vph)	141	467	0	11	576	29	11	12	0	98	11	50
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases						6						8
Actuated Green, G (s)	6.4	32.7		0.6	26.9	26.9	0.6	5.8		4.3	9.5	9.5
Effective Green, g (s)	6.4	32.7		0.6	26.9	26.9	0.6	5.8		4.3	9.5	9.5
Actuated g/C Ratio	0.11	0.55		0.01	0.45	0.45	0.01	0.10		0.07	0.16	0.16
Clearance Time (s)	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
Lane Grp Cap (vph)	191	1022		18	844	717	18	168		128	298	253
v/s Ratio Prot	c0.08	0.25		0.01	c0.31		0.01	0.01		c0.06	0.01	
v/s Ratio Perm						0.02						c0.03
v/c Ratio	0.74	0.46		0.61	0.68	0.04	0.61	0.07		0.77	0.04	0.20
Uniform Delay, d1	25.7	8.0		29.3	12.9	9.1	29.3	24.4		27.1	21.1	21.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.8	0.3		48.7	2.3	0.0	48.7	0.2		23.5	0.1	0.4
Delay (s)	39.5	8.3		78.0	15.2	9.1	78.0	24.5		50.5	21.1	22.0
Level of Service	D	A		E	B	A	E	C		D	C	C
Approach Delay (s)		15.6			15.6			42.3			28.6	
Approach LOS		B			B			D			C	

Intersection Summary

HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 37: Road "J" & Road "A"

Sutter Pointe EIR
 Cumulative Plus Project No PP AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	70	200	310	60	120	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	217	337	65	130	130
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			293		815	76
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			293		815	76
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			73		49	87
cM capacity (veh/h)			1268		255	985
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	76	217	337	65	130	130
Volume Left	0	0	337	0	130	0
Volume Right	0	217	0	0	0	130
cSH	1700	1700	1268	1700	255	985
Volume to Capacity	0.04	0.13	0.27	0.04	0.51	0.13
Queue Length 95th (ft)	0	0	27	0	67	11
Control Delay (s)	0.0	0.0	8.9	0.0	33.1	9.2
Lane LOS			A		D	A
Approach Delay (s)	0.0		7.4		21.1	
Approach LOS					C	
Intersection Summary						
Average Delay			8.9			
Intersection Capacity Utilization			37.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 38: Road "J" & Road "L"

Sutter Pointe EIR
 Cumulative Plus Project No PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Sign Control		Stop	Stop		Stop	
Volume (vph)	130	50	40	90	140	340
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	54	43	98	152	370
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total (vph)	141	54	43	98	152	370
Volume Left (vph)	141	0	0	0	152	0
Volume Right (vph)	0	0	0	98	0	370
Hadj (s)	0.53	0.03	0.03	-0.67	0.53	-0.67
Departure Headway (s)	6.5	6.0	6.1	5.4	6.0	4.8
Degree Utilization, x	0.26	0.09	0.07	0.15	0.25	0.49
Capacity (veh/h)	521	560	545	617	582	729
Control Delay (s)	10.6	8.4	8.4	8.2	9.8	11.1
Approach Delay (s)	10.0		8.3		10.7	
Approach LOS	A		A		B	
Intersection Summary						
Delay			10.2			
HCM Level of Service			B			
Intersection Capacity Utilization			31.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
39: Road "J" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project No PP AM

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	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3523	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3523	
Volume (vph)	30	80	70	110	70	110	40	760	40	40	320	10
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)	33	87	76	120	76	120	43	826	43	43	348	11
RTOR Reduction (vph)	0	0	67	0	0	100	0	0	30	0	2	0
Lane Group Flow (vph)	33	87	9	120	76	20	43	826	13	43	357	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.5	10.5	10.5	9.5	15.5	15.5	27.1	28.1	28.1	27.1	28.1	
Effective Green, g (s)	4.5	10.5	10.5	9.5	15.5	15.5	27.1	28.1	28.1	27.1	28.1	
Actuated g/C Ratio	0.05	0.12	0.12	0.10	0.17	0.17	0.30	0.31	0.31	0.30	0.31	
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)	87	214	182	184	317	269	526	1090	488	526	1085	
v/s Ratio Prot	0.02	c0.05		c0.07	0.04		c0.02	c0.23		0.02	0.10	
v/s Ratio Perm			0.01			0.01			0.01			
v/c Ratio	0.38	0.41	0.05	0.65	0.24	0.08	0.08	0.76	0.03	0.08	0.33	
Uniform Delay, d1	42.0	37.5	35.9	39.3	32.8	31.8	23.1	28.5	22.0	23.1	24.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.8	1.3	0.1	8.0	0.4	0.1	0.3	4.9	0.1	0.3	0.8	
Delay (s)	44.8	38.7	36.0	47.3	33.1	31.9	23.4	33.4	22.1	23.4	25.1	
Level of Service	D	D	D	D	C	C	C	C	C	C	C	
Approach Delay (s)		38.7			38.1			32.4			24.9	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM Average Control Delay			32.4				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			91.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			47.1%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												















HCM Signalized Intersection Capacity Analysis
40: Road "J" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3528		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3528		1770	3539	1583
Volume (vph)	70	10	60	10	10	10	80	460	10	10	550	90
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)	76	11	65	11	11	11	87	500	11	11	598	98
RTOR Reduction (vph)	0	0	57	0	10	0	0	1	0	0	0	46
Lane Group Flow (vph)	76	11	8	11	12	0	87	510	0	11	598	52
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	4.7	8.1	8.1	0.7	4.1		4.8	38.1		0.7	34.0	34.0
Effective Green, g (s)	4.7	8.1	8.1	0.7	4.1		4.8	38.1		0.7	34.0	34.0
Actuated g/C Ratio	0.07	0.13	0.13	0.01	0.06		0.08	0.60		0.01	0.53	0.53
Clearance Time (s)	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
Lane Grp Cap (vph)	131	237	202	19	111		134	2113		19	1892	846
v/s Ratio Prot	c0.04	c0.01		0.01	c0.01		c0.05	0.14		0.01	c0.17	
v/s Ratio Perm			0.01									0.03
v/c Ratio	0.58	0.05	0.04	0.58	0.11		0.65	0.24		0.58	0.32	0.06
Uniform Delay, d1	28.5	24.4	24.3	31.3	28.0		28.6	6.0		31.3	8.3	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.4	0.1	0.1	36.3	0.4		10.4	0.1		36.3	0.1	0.0
Delay (s)	34.9	24.4	24.4	67.6	28.4		38.9	6.0		67.6	8.4	7.2
Level of Service	C	C	C	E	C		D	A		E	A	A
Approach Delay (s)		29.7			41.5			10.8			9.1	
Approach LOS		C			D			B			A	
Intersection Summary												
HCM Average Control Delay			12.6				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			63.6				Sum of lost time (s)		20.0			
Intersection Capacity Utilization			40.2%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

























HCM Signalized Intersection Capacity Analysis
41: Road "G" & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	160	20	310	50	20	710
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	22	337	54	22	772
RTOR Reduction (vph)	0	18	0	23	0	0
Lane Group Flow (vph)	174	4	337	31	22	772
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	10.5	10.5	31.8	31.8	0.9	36.7
Effective Green, g (s)	10.5	10.5	31.8	31.8	0.9	36.7
Actuated g/C Ratio	0.19	0.19	0.58	0.58	0.02	0.66
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)	337	301	2039	912	29	2353
v/s Ratio Prot	c0.10		0.10		0.01	c0.22
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.52	0.01	0.17	0.03	0.76	0.33
Uniform Delay, d1	20.1	18.1	5.5	5.1	27.0	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.0	0.2	0.1	71.7	0.4
Delay (s)	21.4	18.2	5.7	5.1	98.7	4.3
Level of Service	C	B	A	A	F	A
Approach Delay (s)	21.0		5.6			7.0
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			8.6		HCM Level of Service	A
HCM Volume to Capacity ratio			0.37			
Actuated Cycle Length (s)			55.2		Sum of lost time (s)	8.0
Intersection Capacity Utilization			35.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						























HCM Signalized Intersection Capacity Analysis
42: Road "G" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1741		1770	1815		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1741		1770	1815		1770	3539	1583	1770	3539	1583
Volume (vph)	40	40	30	90	50	10	20	750	30	10	430	40
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)	43	43	33	98	54	11	22	815	33	11	467	43
RTOR Reduction (vph)	0	28	0	0	9	0	0	0	22	0	0	29
Lane Group Flow (vph)	43	48	0	98	56	0	22	815	11	11	467	14
Turn Type	Prot		Prot			Prot		Perm		Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	1.3	6.7		5.2	10.6		4.3	15.5	15.5	4.3	15.5	15.5
Effective Green, g (s)	1.3	6.7		5.2	10.6		4.3	15.5	15.5	4.3	15.5	15.5
Actuated g/C Ratio	0.03	0.14		0.11	0.22		0.09	0.32	0.32	0.09	0.32	0.32
Clearance Time (s)	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
Lane Grp Cap (vph)	48	245		193	403		160	1150	514	160	1150	514
v/s Ratio Prot	0.02	c0.03		c0.06	c0.03		c0.01	c0.23		0.01	0.13	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.90	0.19		0.51	0.14		0.14	0.71	0.02	0.07	0.41	0.03
Uniform Delay, d1	23.1	18.1		20.0	14.9		20.0	14.1	10.9	19.9	12.5	11.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	90.6	0.4		2.1	0.2		0.4	2.0	0.0	0.2	0.2	0.0
Delay (s)	113.7	18.5		22.1	15.1		20.4	16.1	11.0	20.0	12.8	11.0
Level of Service	F	B		C	B		C	B	B	C	B	B
Approach Delay (s)		52.9			19.3			16.1			12.8	
Approach LOS		D			B			B			B	
Intersection Summary												
HCM Average Control Delay			18.0			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			47.7			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			39.1%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
43: Road "G" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.95		1.00	0.89		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1770		1770	1664		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1770		1770	1664		1770	3539	1583	1770	3539	1583
Volume (vph)	30	20	10	130	20	50	10	400	80	30	540	30
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)	33	22	11	141	22	54	11	435	87	33	587	33
RTOR Reduction (vph)	0	10	0	0	44	0	0	0	54	0	0	20
Lane Group Flow (vph)	33	23	0	141	32	0	11	435	33	33	587	13
Turn Type	Prot		Prot			Prot		Perm		Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	1.3	4.7		5.3	8.7		4.2	18.7	18.7	4.2	18.7	18.7
Effective Green, g (s)	1.3	4.7		5.3	8.7		4.2	18.7	18.7	4.2	18.7	18.7
Actuated g/C Ratio	0.03	0.10		0.11	0.18		0.09	0.38	0.38	0.09	0.38	0.38
Clearance Time (s)	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
Lane Grp Cap (vph)	47	170		192	296		152	1353	605	152	1353	605
v/s Ratio Prot	0.02	0.01		c0.08	c0.02		0.01	0.12		c0.02	c0.17	
v/s Ratio Perm									0.02			0.01
v/c Ratio	0.70	0.14		0.73	0.11		0.07	0.32	0.05	0.22	0.43	0.02
Uniform Delay, d1	23.6	20.2		21.1	16.8		20.6	10.6	9.5	20.8	11.2	9.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	38.0	0.4		13.5	0.2		0.9	0.6	0.2	3.3	1.0	0.1
Delay (s)	61.6	20.6		34.7	17.0		21.5	11.3	9.7	24.1	12.2	9.5
Level of Service	E	C		C	B		C	B	A	C	B	A
Approach Delay (s)		41.1			28.5			11.2			12.7	
Approach LOS		D			C			B			B	
Intersection Summary												
HCM Average Control Delay			15.8			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			48.9			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			42.1%			ICU Level of Service		A				
Analysis Period (min)			15									
c Critical Lane Group												


























HCM Signalized Intersection Capacity Analysis
44: Road "G" & Road "D"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.93		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1631		1770	1723		1770	3530		1770	3529	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1631		1770	1723		1770	3530		1770	3529	
Volume (vph)	10	10	50	10	10	10	30	580	10	10	510	10
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)	11	11	54	11	11	11	33	630	11	11	554	11
RTOR Reduction (vph)	0	51	0	0	10	0	0	1	0	0	1	0
Lane Group Flow (vph)	11	14	0	11	12	0	33	640	0	11	564	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	4.0		0.7	4.0		0.7	42.9		0.7	42.9	
Effective Green, g (s)	0.7	4.0		0.7	4.0		0.7	42.9		0.7	42.9	
Actuated g/C Ratio	0.01	0.06		0.01	0.06		0.01	0.67		0.01	0.67	
Clearance Time (s)	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	
Lane Grp Cap (vph)	19	101		19	107		19	2355		19	2354	
v/s Ratio Prot	c0.01	c0.01		0.01	0.01		c0.02	c0.18		0.01	0.16	
v/s Ratio Perm												
v/c Ratio	0.58	0.14		0.58	0.11		1.74	0.27		0.58	0.24	
Uniform Delay, d1	31.7	28.5		31.7	28.5		31.8	4.3		31.7	4.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.3	0.6		36.3	0.5		484.4	0.1		36.3	0.1	
Delay (s)	67.9	29.2		67.9	28.9		516.2	4.4		67.9	4.3	
Level of Service	E	C		E	C		F	A		E	A	
Approach Delay (s)		34.8			41.9			29.5			5.5	
Approach LOS		C			D			C			A	
Intersection Summary												
HCM Average Control Delay			19.9				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			64.3				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			36.9%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												



























HCM Signalized Intersection Capacity Analysis
45: Riego Rd & Road "U"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3490		1770	3539	1583	1770	1863	1583	1770	1676	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3490		1770	3539	1583	1770	1863	1583	1770	1676	
Volume (vph)	60	200	20	380	420	360	10	10	120	130	10	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	217	22	413	457	391	11	11	130	141	11	22
RTOR Reduction (vph)	0	9	0	0	0	265	0	0	109	0	20	0
Lane Group Flow (vph)	65	230	0	413	457	126	11	11	21	141	13	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6			4			
Actuated Green, G (s)	7.9	9.9		18.2	20.2	20.2	11.9	10.3	10.3	8.4	6.8	
Effective Green, g (s)	7.9	9.9		18.2	20.2	20.2	11.9	10.3	10.3	8.4	6.8	
Actuated g/C Ratio	0.13	0.16		0.29	0.32	0.32	0.19	0.16	0.16	0.13	0.11	
Clearance Time (s)	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	
Lane Grp Cap (vph)	223	550		513	1138	509	335	306	260	237	181	
v/s Ratio Prot	0.04	0.07		c0.23	c0.13		0.01	0.01		c0.08	0.01	
v/s Ratio Perm						0.08			c0.01			
v/c Ratio	0.29	0.42		0.81	0.40	0.25	0.03	0.04	0.08	0.59	0.07	
Uniform Delay, d1	24.9	23.9		20.7	16.6	15.7	20.8	22.1	22.2	25.6	25.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.5		8.9	0.2	0.3	0.0	0.0	0.1	4.0	0.2	
Delay (s)	25.6	24.4		29.6	16.8	16.0	20.8	22.1	22.4	29.6	25.3	
Level of Service	C	C		C	B	B	C	C	C	C	C	
Approach Delay (s)		24.6			20.7			22.2			28.8	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			22.2				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			62.8				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			51.1%				ICU Level of Service			A		
Analysis Period (min)			15									
c	Critical Lane Group											
































HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Volume (vph)	60	420	10	10	1270	290	30	10	10	10	10	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	457	11	11	1380	315	33	11	11	11	11	22
RTOR Reduction (vph)	0	0	5	0	0	115	0	9	0	0	0	20
Lane Group Flow (vph)	65	457	6	11	1380	200	33	13	0	11	11	2
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6						8
Actuated Green, G (s)	8.2	42.3	42.3	6.2	40.3	40.3	7.0	11.3		1.1	5.4	5.4
Effective Green, g (s)	8.2	42.3	42.3	6.2	40.3	40.3	7.0	11.3		1.1	5.4	5.4
Actuated g/C Ratio	0.11	0.55	0.55	0.08	0.52	0.52	0.09	0.15		0.01	0.07	0.07
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)	189	1947	871	143	1855	830	161	253		25	131	111
v/s Ratio Prot	c0.04	0.13		0.01	c0.39		c0.02	0.01		0.01	c0.01	
v/s Ratio Perm			0.00			0.13						0.00
v/c Ratio	0.34	0.23	0.01	0.08	0.74	0.24	0.20	0.05		0.44	0.08	0.01
Uniform Delay, d1	31.9	8.9	7.8	32.7	14.3	10.0	32.4	28.2		37.6	33.4	33.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	0.1	0.0	0.2	1.7	0.2	0.6	0.1		11.9	0.3	0.1
Delay (s)	32.9	9.0	7.8	32.9	15.9	10.1	33.0	28.3		49.5	33.7	33.3
Level of Service	C	A	A	C	B	B	C	C		D	C	C
Approach Delay (s)		11.9			15.0			31.1			37.5	
Approach LOS		B			B			C			D	
Intersection Summary												
HCM Average Control Delay			15.1				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			76.9				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			56.8%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"
































Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	330	960	90	130	1800	100	150	140	70	110	180	420
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)	359	1043	98	141	1957	109	163	152	76	120	196	457
RTOR Reduction (vph)	0	0	58	0	0	46	0	0	59	0	0	175
Lane Group Flow (vph)	359	1043	40	141	1957	63	163	152	17	120	196	282
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	12.1	44.4	44.4	13.1	45.4	45.4	11.1	23.8	23.8	10.3	23.0	23.0
Effective Green, g (s)	12.1	44.4	44.4	13.1	45.4	45.4	11.1	23.8	23.8	10.3	23.0	23.0
Actuated g/C Ratio	0.11	0.41	0.41	0.12	0.42	0.42	0.10	0.22	0.22	0.10	0.21	0.21
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)	386	2098	653	215	2146	668	183	783	350	169	756	338
v/s Ratio Prot	c0.10	0.21		0.08	c0.38		c0.09	0.04		0.07	0.06	
v/s Ratio Perm			0.03			0.04			0.01			c0.18
v/c Ratio	0.93	0.50	0.06	0.66	0.91	0.09	0.89	0.19	0.05	0.71	0.26	0.83
Uniform Delay, d1	47.3	23.4	19.0	45.1	29.2	18.7	47.7	34.1	33.0	47.2	35.2	40.5
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	28.8	0.8	0.2	7.0	7.3	0.3	37.5	0.1	0.1	13.1	0.2	16.0
Delay (s)	76.1	24.2	19.2	52.1	36.6	19.0	85.1	34.2	33.0	60.3	35.4	56.4
Level of Service	E	C	B	D	D	B	F	C	C	E	D	E
Approach Delay (s)		36.3			36.7			55.2			51.7	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	107.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"













Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.97	0.95	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	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	280	470	130	240	1460	420	160	220	140	390	170	30
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)	304	511	141	261	1587	457	174	239	152	424	185	33
RTOR Reduction (vph)	0	0	89	0	0	220	0	0	130	0	0	27
Lane Group Flow (vph)	304	511	52	261	1587	237	174	239	22	424	185	6
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	21.2	40.4	40.4	20.1	39.3	39.3	14.5	15.8	15.8	18.1	19.4	19.4
Effective Green, g (s)	21.2	40.4	40.4	20.1	39.3	39.3	14.5	15.8	15.8	18.1	19.4	19.4
Actuated g/C Ratio	0.19	0.37	0.37	0.18	0.36	0.36	0.13	0.14	0.14	0.16	0.18	0.18
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)	340	1861	579	322	1810	564	232	506	227	563	622	278
v/s Ratio Prot	c0.17	0.10		0.15	c0.31		0.10	c0.07		c0.12	c0.05	
v/s Ratio Perm			0.03			0.15			0.01			0.00
v/c Ratio	0.89	0.27	0.09	0.81	0.88	0.42	0.75	0.47	0.10	0.75	0.30	0.02
Uniform Delay, d1	43.5	24.7	22.9	43.3	33.3	26.9	46.2	43.5	41.1	44.0	39.6	37.6
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	24.4	0.4	0.3	14.3	6.3	2.3	12.8	0.7	0.2	9.0	0.3	0.0
Delay (s)	67.9	25.0	23.2	57.6	39.6	29.2	59.0	44.2	41.3	53.0	39.8	37.7
Level of Service	E	C	C	E	D	C	E	D	D	D	D	D
Approach Delay (s)		38.4			39.6			47.9			48.4	
Approach LOS		D			D			D			D	

Intersection Summary		
HCM Average Control Delay	41.7	HCM Level of Service D
HCM Volume to Capacity ratio	0.81	
Actuated Cycle Length (s)	110.4	Sum of lost time (s) 20.0
Intersection Capacity Utilization	74.3%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

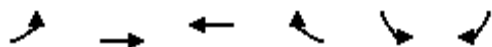
HCM Signalized Intersection Capacity Analysis
53: Road "T" & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project No PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	190	10	60	350	20	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	207	11	65	380	22	174
RTOR Reduction (vph)	0	9	0	284	0	0
Lane Group Flow (vph)	207	2	65	96	22	174
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	8.0	8.0	9.0	9.0	6.7	19.7
Effective Green, g (s)	8.0	8.0	9.0	9.0	6.7	19.7
Actuated g/C Ratio	0.22	0.22	0.25	0.25	0.19	0.55
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)	397	355	470	399	332	1028
v/s Ratio Prot	c0.12		0.03		0.01	c0.09
v/s Ratio Perm		0.00		c0.06		
v/c Ratio	0.52	0.01	0.14	0.24	0.07	0.17
Uniform Delay, d1	12.2	10.8	10.3	10.6	11.9	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.0	0.1	0.3	0.1	0.1
Delay (s)	13.4	10.8	10.5	10.9	12.0	4.0
Level of Service	B	B	B	B	B	A
Approach Delay (s)	13.3		10.9			4.9
Approach LOS	B		B			A
Intersection Summary						
HCM Average Control Delay			10.1		HCM Level of Service	B
HCM Volume to Capacity ratio			0.33			
Actuated Cycle Length (s)			35.7		Sum of lost time (s)	12.0
Intersection Capacity Utilization			31.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
54: Road "T" & Road "U"

Sutter Pointe EIR
Cumulative Plus Project No PP AM















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	140	140	10	10	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	152	152	11	11	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	163				332	158
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	163				332	158
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	99
cM capacity (veh/h)	1416				658	888

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	11	152	163	11	11
Volume Left	11	0	0	11	0
Volume Right	0	0	11	0	11
cSH	1416	1700	1700	658	888
Volume to Capacity	0.01	0.09	0.10	0.02	0.01
Queue Length 95th (ft)	1	0	0	1	1
Control Delay (s)	7.6	0.0	0.0	10.6	9.1
Lane LOS	A			B	A
Approach Delay (s)	0.5		0.0	9.8	
Approach LOS				A	

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization		18.3%		ICU Level of Service	A
Analysis Period (min)		15			

HCM Unsignalized Intersection Capacity Analysis
55: Road "Q" & Road "R"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	200	10	20	20	10	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	217	11	22	22	11	65
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	109	22			43	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	109	22			43	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	75	99			99	
cM capacity (veh/h)	882	1055			1565	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	217	11	22	22	11	65
Volume Left	217	0	0	0	11	0
Volume Right	0	11	0	22	0	0
cSH	882	1055	1700	1700	1565	1700
Volume to Capacity	0.25	0.01	0.01	0.01	0.01	0.04
Queue Length 95th (ft)	24	1	0	0	1	0
Control Delay (s)	10.4	8.4	0.0	0.0	7.3	0.0
Lane LOS	B	A			A	
Approach Delay (s)	10.3		0.0		1.0	
Approach LOS	B					
Intersection Summary						
Average Delay			7.0			
Intersection Capacity Utilization			25.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
56: Road "T" & Road "R"
























Sutter Pointe EIR
Cumulative Plus Project No PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	30	40	40	10	40	220
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	43	43	11	43	239
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	54				152	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	54				152	43
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	77
cM capacity (veh/h)	1551				822	1027
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	33	43	43	11	43	239
Volume Left	33	0	0	0	43	0
Volume Right	0	0	0	11	0	239
cSH	1551	1700	1700	1700	822	1027
Volume to Capacity	0.02	0.03	0.03	0.01	0.05	0.23
Queue Length 95th (ft)	2	0	0	0	4	23
Control Delay (s)	7.4	0.0	0.0	0.0	9.6	9.6
Lane LOS	A				A	A
Approach Delay (s)	3.2		0.0		9.6	
Approach LOS					A	
Intersection Summary						
Average Delay			7.1			
Intersection Capacity Utilization			23.6%		ICU Level of Service	A
Analysis Period (min)			15			
























HCM Signalized Intersection Capacity Analysis
57: Road "Q" & Road "S"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1770		1770	1863	1583	1770	1863	1583	1770	1857	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1770		1770	1863	1583	1770	1863	1583	1770	1857	
Volume (vph)	10	20	10	410	250	70	20	270	40	10	480	10
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)	11	22	11	446	272	76	22	293	43	11	522	11
RTOR Reduction (vph)	0	10	0	0	0	47	0	0	28	0	1	0
Lane Group Flow (vph)	11	23	0	446	272	29	22	293	15	11	532	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	1.3	7.7		27.4	33.8	33.8	6.7	31.7	31.7	6.2	31.2	
Effective Green, g (s)	1.3	7.7		27.4	33.8	33.8	6.7	31.7	31.7	6.2	31.2	
Actuated g/C Ratio	0.01	0.09		0.31	0.38	0.38	0.08	0.36	0.36	0.07	0.35	
Clearance Time (s)	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	
Lane Grp Cap (vph)	26	153		545	708	601	133	664	564	123	651	
v/s Ratio Prot	0.01	0.01		c0.25	c0.15		c0.01	0.16		0.01	c0.29	
v/s Ratio Perm						0.02			0.01			
v/c Ratio	0.42	0.15		0.82	0.38	0.05	0.17	0.44	0.03	0.09	0.82	
Uniform Delay, d1	43.5	37.6		28.5	20.0	17.4	38.5	21.9	18.6	38.8	26.3	
Progression Factor	1.01	0.98		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.7	0.5		9.3	0.3	0.0	0.6	0.5	0.0	0.3	7.9	
Delay (s)	54.7	37.4		37.8	20.4	17.5	39.1	22.4	18.6	39.1	34.2	
Level of Service	D	D		D	C	B	D	C	B	D	C	
Approach Delay (s)		41.7			29.9			22.9			34.3	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM Average Control Delay			30.1		HCM Level of Service						C	
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			89.0		Sum of lost time (s)						12.0	
Intersection Capacity Utilization			61.9%		ICU Level of Service						B	
Analysis Period (min)			15									
c Critical Lane Group												



































HCM Signalized Intersection Capacity Analysis
58: Road "B" North & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3539	1583	1770	3539	1583
Volume (vph)	70	10	20	90	10	10	20	370	10	10	1120	150
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)	76	11	22	98	11	11	22	402	11	11	1217	163
RTOR Reduction (vph)	0	0	20	0	10	0	0	0	4	0	0	66
Lane Group Flow (vph)	76	11	2	98	12	0	22	402	7	11	1217	97
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	7.3	6.5	6.5	6.4	5.6		0.7	43.9	43.9	0.7	43.9	43.9
Effective Green, g (s)	7.3	6.5	6.5	6.4	5.6		0.7	43.9	43.9	0.7	43.9	43.9
Actuated g/C Ratio	0.10	0.09	0.09	0.09	0.08		0.01	0.60	0.60	0.01	0.60	0.60
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)	176	165	140	154	131		17	2114	945	17	2114	945
v/s Ratio Prot	0.04	0.01		c0.06	c0.01		c0.01	0.11		0.01	c0.34	
v/s Ratio Perm			0.00						0.00			0.06
v/c Ratio	0.43	0.07	0.01	0.64	0.09		1.29	0.19	0.01	0.65	0.58	0.10
Uniform Delay, d1	31.1	30.7	30.6	32.4	31.6		36.4	6.7	6.0	36.3	9.1	6.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.2	0.0	8.3	0.3		323.2	0.0	0.0	62.0	0.4	0.0
Delay (s)	32.8	30.9	30.6	40.8	31.9		359.6	6.8	6.0	98.3	9.5	6.4
Level of Service	C	C	C	D	C		F	A	A	F	A	A
Approach Delay (s)		32.2			39.1			24.6			9.8	
Approach LOS		C			D			C			A	
Intersection Summary												
HCM Average Control Delay			15.8				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			73.5				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			49.3%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
59: Road "B" South & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	30	20	20	40	140	180	80	240	30	210	390	700
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)	33	22	22	43	152	196	87	261	33	228	424	761
RTOR Reduction (vph)	0	0	19	0	0	165	0	0	23	0	0	506
Lane Group Flow (vph)	33	22	3	43	152	31	87	261	10	228	424	255
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	3.8	12.7	12.7	4.8	13.7	13.7	26.5	26.5	26.5	26.5	26.5	26.5
Effective Green, g (s)	3.8	12.7	12.7	4.8	13.7	13.7	26.5	26.5	26.5	26.5	26.5	26.5
Actuated g/C Ratio	0.04	0.15	0.15	0.06	0.16	0.16	0.31	0.31	0.31	0.31	0.31	0.31
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)	151	274	232	98	295	251	542	1084	485	542	1084	485
v/s Ratio Prot	0.01	0.01		c0.02	c0.08		0.05	0.07		c0.13	0.12	
v/s Ratio Perm			0.00			0.02			0.01			c0.16
v/c Ratio	0.22	0.08	0.01	0.44	0.52	0.12	0.16	0.24	0.02	0.42	0.39	0.53
Uniform Delay, d1	39.9	31.9	31.5	39.5	33.4	31.2	21.9	22.5	20.9	23.9	23.6	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	0.0	3.1	1.5	0.2	0.6	0.5	0.1	2.4	1.1	4.0
Delay (s)	40.6	32.0	31.6	42.7	34.9	31.5	22.5	23.0	21.0	26.3	24.7	28.9
Level of Service	D	C	C	D	C	C	C	C	C	C	C	C
Approach Delay (s)		35.6			34.0			22.7			27.2	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM Average Control Delay			27.9				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			86.5				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			65.1%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 60: Road "B" North & Pacific Avenue

Sutter Pointe EIR
 Cumulative Plus Project No PP AM


























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	10	60	10	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	65	11	33	33
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	65				103	71
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	65				103	71
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	97
cM capacity (veh/h)	1537				889	992

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	11	11	76	33	33
Volume Left	11	0	0	33	0
Volume Right	0	0	11	0	33
cSH	1537	1700	1700	889	992
Volume to Capacity	0.01	0.01	0.04	0.04	0.03
Queue Length 95th (ft)	1	0	0	3	3
Control Delay (s)	7.4	0.0	0.0	9.2	8.8
Lane LOS	A			A	A
Approach Delay (s)	3.7		0.0	9.0	
Approach LOS				A	

Intersection Summary					
Average Delay			4.1		
Intersection Capacity Utilization			17.2%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Signalized Intersection Capacity Analysis
61: Road "B" North & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3525		1770	3485	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3525		1770	3485	
Volume (vph)	10	10	40	10	10	10	20	370	10	10	350	40
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)	11	11	43	11	11	11	22	402	11	11	380	43
RTOR Reduction (vph)	0	0	40	0	10	0	0	1	0	0	6	0
Lane Group Flow (vph)	11	11	3	11	12	0	22	412	0	11	417	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.8	4.7	4.7	0.8	4.7		0.8	50.1		0.8	50.1	
Effective Green, g (s)	0.8	4.7	4.7	0.8	4.7		0.8	50.1		0.8	50.1	
Actuated g/C Ratio	0.01	0.06	0.06	0.01	0.06		0.01	0.69		0.01	0.69	
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)	20	121	103	20	112		20	2439		20	2412	
v/s Ratio Prot	c0.01	0.01		0.01	c0.01		c0.01	0.12		0.01	c0.12	
v/s Ratio Perm			0.00									
v/c Ratio	0.55	0.09	0.03	0.55	0.10		1.10	0.17		0.55	0.17	
Uniform Delay, d1	35.6	31.8	31.7	35.6	31.9		35.8	3.9		35.6	3.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.9	0.3	0.1	28.9	0.4		234.8	0.0		28.9	0.0	
Delay (s)	64.5	32.2	31.8	64.5	32.3		270.6	3.9		64.5	3.9	
Level of Service	E	C	C	E	C		F	A		E	A	
Approach Delay (s)		37.4			43.0			17.4			5.5	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM Average Control Delay			14.3			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.19									
Actuated Cycle Length (s)			72.4			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			30.5%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
62: Road "B" South & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1793		1770	1863	1583	1770	3274		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1793		1770	1863	1583	1770	3274		1770	3539	1583
Volume (vph)	210	30	10	10	100	190	10	10	10	90	10	310
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)	228	33	11	11	109	207	11	11	11	98	11	337
RTOR Reduction (vph)	0	7	0	0	0	167	0	8	0	0	0	227
Lane Group Flow (vph)	228	37	0	11	109	40	11	14	0	98	11	110
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	11.0	21.5		0.5	11.0	11.0	0.5	15.2		4.0	18.7	18.7
Effective Green, g (s)	11.0	21.5		0.5	11.0	11.0	0.5	15.2		4.0	18.7	18.7
Actuated g/C Ratio	0.19	0.38		0.01	0.19	0.19	0.01	0.27		0.07	0.33	0.33
Clearance Time (s)	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
Lane Grp Cap (vph)	340	674		15	358	304	15	870		124	1157	518
v/s Ratio Prot	c0.13	0.02		0.01	c0.06		0.01	0.00		c0.06	0.00	
v/s Ratio Perm						0.03						c0.07
v/c Ratio	0.67	0.06		0.73	0.30	0.13	0.73	0.02		0.79	0.01	0.21
Uniform Delay, d1	21.4	11.4		28.3	19.8	19.1	28.3	15.5		26.2	13.0	13.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.1	0.0		103.2	0.5	0.2	103.2	0.0		28.1	0.0	0.2
Delay (s)	26.5	11.4		131.5	20.3	19.3	131.5	15.5		54.3	13.0	14.1
Level of Service	C	B		F	C	B	F	B		D	B	B
Approach Delay (s)		24.1			23.4			54.2			22.9	
Approach LOS		C			C			D			C	

Intersection Summary

HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
63: Road "B" North & Road "D"













Sutter Pointe EIR
Cumulative Plus Project No PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↑	↗	↖	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	10	30	400	310	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	33	435	337	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	33				65	33
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	33				65	33
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				64	99
cM capacity (veh/h)	1579				934	1041
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	11	11	33	435	337	11
Volume Left	11	0	0	0	337	0
Volume Right	0	0	0	435	0	11
cSH	1579	1700	1700	1700	934	1041
Volume to Capacity	0.01	0.01	0.02	0.26	0.36	0.01
Queue Length 95th (ft)	1	0	0	0	41	1
Control Delay (s)	7.3	0.0	0.0	0.0	11.0	8.5
Lane LOS	A				B	A
Approach Delay (s)	3.6		0.0		10.9	
Approach LOS					B	
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			34.8%		ICU Level of Service	A
Analysis Period (min)			15			













HCM Signalized Intersection Capacity Analysis
64: Elverta Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project No PP AM

													
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	
Lane Util. Factor		0.95	1.00		1.00	1.00				1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (prot)		3539	1583		1863	1583				1770	1583	1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (perm)		3539	1583		1863	1583				1770	1583	1583	
Volume (vph)	0	150	110	0	740	610	0	0	0	190	0	210	
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	163	120	0	804	663	0	0	0	207	0	228	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	134	
Lane Group Flow (vph)	0	163	120	0	804	663	0	0	0	207	0	94	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		35.5	55.3		35.5	55.3				11.8		11.8	
Effective Green, g (s)		35.5	55.3		35.5	55.3				11.8		11.8	
Actuated g/C Ratio		0.64	1.00		0.64	1.00				0.21		0.21	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2272	1583		1196	1583				378		338	
v/s Ratio Prot		0.05			c0.43					0.12			
v/s Ratio Perm			0.08			c0.42						0.06	
v/c Ratio		0.07	0.08		0.67	0.42				0.55		0.28	
Uniform Delay, d1		3.7	0.0		6.2	0.0				19.4		18.2	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.1		3.0	0.8				1.6		0.5	
Delay (s)		3.7	0.1		9.3	0.8				21.0		18.6	
Level of Service		A	A		A	A				C		B	
Approach Delay (s)		2.2			5.4			0.0			19.8		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			7.9									HCM Level of Service	A
HCM Volume to Capacity ratio			0.59										
Actuated Cycle Length (s)			55.3									Sum of lost time (s)	4.0
Intersection Capacity Utilization			58.6%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
65: Elverta Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project No PP AM

													
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	1.00		0.95	1.00	1.00		1.00				
Frt		1.00	0.85		1.00	0.85	1.00		0.85				
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00				
Satd. Flow (prot)		1863	1583		3539	1583	1770		1583				
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00				
Satd. Flow (perm)		1863	1583		3539	1583	1770		1583				
Volume (vph)	0	260	80	0	990	330	360	0	210	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)	0	283	87	0	1076	359	391	0	228	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	283	87	0	1076	359	391	0	228	0	0	0	
Turn Type			Free			Free	Prot		Free				
Protected Phases		2			6		4						
Permitted Phases			Free			Free			Free				
Actuated Green, G (s)		23.9	46.3		23.9	46.3	14.4		46.3				
Effective Green, g (s)		23.9	46.3		23.9	46.3	14.4		46.3				
Actuated g/C Ratio		0.52	1.00		0.52	1.00	0.31		1.00				
Clearance Time (s)		4.0			4.0		4.0						
Vehicle Extension (s)		3.0			3.0		3.0						
Lane Grp Cap (vph)		962	1583		1827	1583	550		1583				
v/s Ratio Prot		0.15			c0.30		c0.22						
v/s Ratio Perm			0.05			0.23			0.14				
v/c Ratio		0.29	0.05		0.59	0.23	0.71		0.14				
Uniform Delay, d1		6.4	0.0		7.8	0.0	14.1		0.0				
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00				
Incremental Delay, d2		0.8	0.1		0.5	0.3	4.3		0.2				
Delay (s)		7.2	0.1		8.3	0.3	18.4		0.2				
Level of Service		A	A		A	A	B		A				
Approach Delay (s)		5.5			6.3			11.7			0.0		
Approach LOS		A			A			B			A		
Intersection Summary													
HCM Average Control Delay			7.6									HCM Level of Service	A
HCM Volume to Capacity ratio			0.63										
Actuated Cycle Length (s)			46.3									Sum of lost time (s)	8.0
Intersection Capacity Utilization			54.0%									ICU Level of Service	A
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
66: Sankey Rd & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP AM



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	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	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	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	230	10	30	440	90	260	190	610	40	20	520	130
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)	250	11	33	478	98	283	207	663	43	22	565	141
RTOR Reduction (vph)	0	0	30	0	0	175	0	0	25	0	0	93
Lane Group Flow (vph)	250	11	3	478	98	108	207	663	18	22	565	48
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	13.1	8.5	8.5	17.4	12.8	12.8	11.1	33.3	33.3	5.0	27.2	27.2
Effective Green, g (s)	13.1	8.5	8.5	17.4	12.8	12.8	11.1	33.3	33.3	5.0	27.2	27.2
Actuated g/C Ratio	0.16	0.11	0.11	0.22	0.16	0.16	0.14	0.42	0.42	0.06	0.34	0.34
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)	289	375	168	745	565	253	245	1469	657	110	1200	537
v/s Ratio Prot	c0.14	0.00		c0.14	0.03		c0.12	c0.19		0.01	0.16	
v/s Ratio Perm			0.00			c0.07			0.01			0.03
v/c Ratio	0.87	0.03	0.02	0.64	0.17	0.43	0.84	0.45	0.03	0.20	0.47	0.09
Uniform Delay, d1	32.7	32.2	32.1	28.6	29.1	30.4	33.7	16.9	13.9	35.7	20.8	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.6	0.0	0.1	1.9	0.1	1.2	28.4	1.0	0.1	4.0	1.3	0.3
Delay (s)	55.3	32.2	32.2	30.5	29.3	31.6	62.1	17.9	13.9	39.7	22.2	18.4
Level of Service	E	C	C	C	C	C	E	B	B	D	C	B
Approach Delay (s)		51.8			30.7			27.7			22.0	
Approach LOS		D			C			C			C	

Intersection Summary

HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	20	10	10	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	10	10	10	21	10	10	10	10	10
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	108	98	15	108	98	15	21			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108	98	15	108	98	15	21			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	841	777	1064	841	777	1064	1595			1595		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	31	31	41	31								
Volume Left	10	10	21	10								
Volume Right	10	10	10	10								
cSH	878	878	1595	1595								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	0								
Control Delay (s)	9.2	9.2	3.7	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	3.7	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			13.5%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	10	10	10	1160	10	380	10	2370	810	310	1280	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	10	1196	10	392	10	2443	835	320	1320	10
RTOR Reduction (vph)	0	10	0	0	0	23	0	0	0	0	0	0
Lane Group Flow (vph)	10	10	0	1196	10	369	10	2443	835	320	1320	10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		pm+ov	Prot		Free	Prot		Free
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)	0.8	5.9		29.0	34.1	50.1	0.8	76.4	143.3	16.0	91.6	143.3
Effective Green, g (s)	0.8	5.9		29.0	34.1	50.1	0.8	76.4	143.3	16.0	91.6	143.3
Actuated g/C Ratio	0.01	0.04		0.20	0.24	0.35	0.01	0.53	1.00	0.11	0.64	1.00
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)	10	71		695	443	598	10	1540	1583	198	2137	1583
v/s Ratio Prot	0.01	0.01		c0.35	0.01	c0.07	0.01	c0.85		c0.18	0.39	
v/s Ratio Perm						0.16			0.53			0.01
v/c Ratio	1.00	0.15		1.72	0.02	0.62	1.00	1.59	0.53	1.62	0.62	0.01
Uniform Delay, d1	71.2	66.3		57.2	41.8	38.6	71.2	33.5	0.0	63.7	15.4	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	284.6	1.0		330.5	0.0	1.9	284.6	267.0	1.3	299.4	0.5	0.0
Delay (s)	355.9	67.2		387.6	41.9	40.5	355.9	300.4	1.3	363.0	15.9	0.0
Level of Service	F	E		F	D	D	F	F	A	F	B	A
Approach Delay (s)		163.4			300.3			224.6			83.2	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	207.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.55		
Actuated Cycle Length (s)	143.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	132.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Sankey Rd & Road "H"

Sutter Pointe EIR
Cumulative Plus Project No PP PM





















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	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Volume (vph)	610	250	250	10	360	100	510	190	70	100	320	670
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	629	258	258	10	371	103	526	196	72	103	330	691
RTOR Reduction (vph)	0	0	161	0	0	83	0	0	47	0	0	273
Lane Group Flow (vph)	629	258	97	10	371	20	526	196	25	103	330	418
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6			4			8
Actuated Green, G (s)	17.0	33.7	33.7	0.8	17.5	17.5	14.0	30.9	30.9	8.0	24.9	24.9
Effective Green, g (s)	17.0	33.7	33.7	0.8	17.5	17.5	14.0	30.9	30.9	8.0	24.9	24.9
Actuated g/C Ratio	0.19	0.38	0.38	0.01	0.20	0.20	0.16	0.35	0.35	0.09	0.28	0.28
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)	653	1334	597	16	693	310	538	1223	547	158	986	441
v/s Ratio Prot	c0.18	0.07		0.01	c0.10		c0.15	0.06		0.06	0.09	
v/s Ratio Perm			0.06			0.01			0.02			c0.26
v/c Ratio	0.96	0.19	0.16	0.62	0.54	0.07	0.98	0.16	0.05	0.65	0.33	0.95
Uniform Delay, d1	35.9	18.7	18.5	44.2	32.3	29.3	37.5	20.3	19.4	39.4	25.7	31.6
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	26.2	0.1	0.1	57.6	0.8	0.1	32.8	0.1	0.0	9.3	0.2	29.5
Delay (s)	62.1	18.8	18.6	101.7	33.1	29.4	70.3	20.3	19.5	48.6	25.9	61.1
Level of Service	E	B	B	F	C	C	E	C	B	D	C	E
Approach Delay (s)		42.5			33.7			53.4			49.6	
Approach LOS		D			C			D			D	

Intersection Summary

HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

































HCM Signalized Intersection Capacity Analysis
4: Riego Rd & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.86		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1832		1770	1848		1770	1595		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1832		1770	1848		1770	1595		1770	1723	
Volume (vph)	10	80	10	220	360	20	70	10	230	10	10	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	82	10	227	371	21	72	10	237	10	10	10
RTOR Reduction (vph)	0	9	0	0	3	0	0	173	0	0	8	0
Lane Group Flow (vph)	10	83	0	227	389	0	72	74	0	10	12	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.5	6.3		9.3	15.1		2.0	11.9		0.5	10.4	
Effective Green, g (s)	0.5	6.3		9.3	15.1		2.0	11.9		0.5	10.4	
Actuated g/C Ratio	0.01	0.14		0.21	0.34		0.05	0.27		0.01	0.24	
Clearance Time (s)	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	
Lane Grp Cap (vph)	20	262		374	634		80	431		20	407	
v/s Ratio Prot	0.01	0.05		c0.13	c0.21		c0.04	c0.05		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.50	0.32		0.61	0.61		0.90	0.17		0.50	0.03	
Uniform Delay, d1	21.6	16.9		15.7	12.0		20.9	12.3		21.6	12.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.3	0.7		2.8	1.8		67.8	0.2		18.3	0.0	
Delay (s)	39.9	17.6		18.5	13.8		88.7	12.5		39.9	13.0	
Level of Service	D	B		B	B		F	B		D	B	
Approach Delay (s)		19.8			15.5			29.7			21.9	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM Average Control Delay			20.3			HCM Level of Service					C	
HCM Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			44.0			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			41.6%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Volume (vph)	810	1550	1840	1800	970	320	1080	2060	1810	110	1850	490
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	835	1598	1897	1856	1000	330	1113	2124	1866	113	1907	505
RTOR Reduction (vph)	0	0	232	0	0	45	0	0	0	0	0	0
Lane Group Flow (vph)	835	1598	1665	1856	1000	285	1113	2124	1866	113	1907	505
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	12%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	39.0	46.0	46.0	28.0	35.0	35.0	32.0	65.0	160.0	5.0	38.0	160.0
Effective Green, g (s)	39.0	46.0	46.0	28.0	35.0	35.0	32.0	65.0	160.0	5.0	38.0	160.0
Actuated g/C Ratio	0.24	0.29	0.29	0.18	0.22	0.22	0.20	0.41	1.00	0.03	0.24	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	837	1462	455	601	1112	346	354	1358	1583	55	765	1583
v/s Ratio Prot	0.24	0.31		c0.54	0.20		c0.63	0.64		0.06	c0.59	
v/s Ratio Perm			c1.05			0.18			1.18			0.32
v/c Ratio	1.00	1.09	3.66	3.09	0.90	0.82	3.14	1.56	1.18	2.05	2.49	0.32
Uniform Delay, d1	60.5	57.0	57.0	66.0	60.8	59.5	64.0	47.5	80.0	77.5	61.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.3	53.2	1202.6	944.1	9.8	14.5	972.2	257.5	87.4	531.5	675.7	0.5
Delay (s)	90.7	110.2	1259.6	1010.1	70.6	74.1	1036.2	305.0	167.4	609.0	736.7	0.5
Level of Service	F	F	F	F	E	E	F	F	F	F	F	A
Approach Delay (s)		610.0			618.3			414.1			583.7	
Approach LOS		F			F			F			F	



































Intersection Summary

HCM Average Control Delay	541.4	HCM Level of Service	F
HCM Volume to Capacity ratio	3.13		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	226.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group













HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.97	0.86	1.00	0.97	0.86	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	390	2130	80	10	1730	280	40	120	320	190	30	560
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	402	2196	82	10	1784	289	41	124	330	196	31	577
RTOR Reduction (vph)	0	0	39	0	0	179	0	0	85	0	0	140
Lane Group Flow (vph)	402	2196	43	10	1784	110	41	124	245	196	31	437
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	14.0	52.5	52.5	0.8	39.3	39.3	3.2	35.2	35.2	18.0	50.0	50.0
Effective Green, g (s)	14.0	52.5	52.5	0.8	39.3	39.3	3.2	35.2	35.2	18.0	50.0	50.0
Actuated g/C Ratio	0.11	0.43	0.43	0.01	0.32	0.32	0.03	0.29	0.29	0.15	0.41	0.41
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)	392	2746	678	22	2056	508	90	1017	455	504	1444	646
v/s Ratio Prot	c0.12	0.34		0.00	c0.28		0.01	0.04		c0.06	0.01	
v/s Ratio Perm			0.03			0.07			0.15			c0.28
v/c Ratio	1.03	0.80	0.06	0.45	0.87	0.22	0.46	0.12	0.54	0.39	0.02	0.68
Uniform Delay, d1	54.2	30.4	20.6	60.6	39.2	30.4	58.8	32.2	36.8	47.3	21.6	29.6
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	52.1	2.5	0.2	14.2	5.3	1.0	3.6	0.1	1.2	2.3	0.0	5.6
Delay (s)	106.4	33.0	20.7	74.8	44.4	31.4	62.4	32.3	38.0	49.5	21.7	35.3
Level of Service	F	C	C	E	D	C	E	C	D	D	C	D
Approach Delay (s)		43.6			42.8			38.6			38.2	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			42.2	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			122.5	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			73.1%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	2090	100	0	1530	0	0	0	30	0	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	2155	103	0	1577	0	0	0	31	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)												
pX, platoon unblocked												
vC, conflicting volume	1577			2258			2680	3732	718	2326	3835	526
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1577			2258			2680	3732	718	2326	3835	526
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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			100			100	100	92	100	100	100
cM capacity (veh/h)	413			224			11	4	371	18	4	497
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1				
Volume Total	718	718	718	103	526	526	526	31				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	103	0	0	0	31				
cSH	1700	1700	1700	1700	1700	1700	1700	371				
Volume to Capacity	0.42	0.42	0.42	0.06	0.31	0.31	0.31	0.08				
Queue Length 95th (ft)	0	0	0	0	0	0	0	7				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6				
Lane LOS								C				
Approach Delay (s)	0.0				0.0			15.6				
Approach LOS								C				
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization		50.4%		ICU Level of Service	A							
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Cumulative Plus Project No PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	↘
Sign Control		Stop	Stop		Stop	
Volume (vph)	140	1980	1460	150	100	70
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	144	2041	1505	155	103	72
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	2186	1505	155	175		
Volume Left (vph)	144	0	0	103		
Volume Right (vph)	0	0	155	72		
Hadj (s)	0.05	0.03	-0.67	-0.10		
Departure Headway (s)	5.6	5.9	5.2	6.9		
Degree Utilization, x	3.40	2.47	0.22	0.33		
Capacity (veh/h)	647	624	684	518		
Control Delay (s)	1098.1	677.2	8.5	13.3		
Approach Delay (s)	1098.1	614.9		13.3		
Approach LOS	F	F		B		
Intersection Summary						
Delay			851.4			
HCM Level of Service			F			
Intersection Capacity Utilization			208.6%		ICU Level of Service	H
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	↗
Sign Control	Stop			Stop	Stop	
Volume (vph)	1390	690	60	1060	550	60
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	1433	711	62	1093	567	62
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	1433	711	1155	629		
Volume Left (vph)	0	0	62	567		
Volume Right (vph)	0	711	0	62		
Hadj (s)	0.03	-0.67	0.04	0.16		
Departure Headway (s)	7.6	6.9	7.1	7.1		
Degree Utilization, x	3.03	1.37	2.29	1.25		
Capacity (veh/h)	476	532	515	512		
Control Delay (s)	935.0	196.6	601.4	150.0		
Approach Delay (s)	690.1		601.4	150.0		
Approach LOS	F		F	F		
Intersection Summary						
Delay			577.5			
HCM Level of Service			F			
Intersection Capacity Utilization			145.6%	ICU Level of Service	H	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	1340	100	40	1020	70	70	10	190	590	50	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1381	103	41	1052	72	72	10	196	608	52	10
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	1495	1165	278	670								
Volume Left (vph)	10	41	72	608								
Volume Right (vph)	103	72	196	10								
Hadj (s)	-0.01	0.00	-0.34	0.21								
Departure Headway (s)	8.8	8.8	9.2	9.0								
Degree Utilization, x	3.66	2.86	0.71	1.68								
Capacity (veh/h)	412	419	383	410								
Control Delay (s)	1222.2	861.2	32.1	339.5								
Approach Delay (s)	1222.2	861.2	32.1	339.5								
Approach LOS	F	F	D	F								
Intersection Summary												
Delay			849.9									
HCM Level of Service			F									
Intersection Capacity Utilization			147.2%		ICU Level of Service					H		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM





































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	0.91	1.00	1.00	0.91	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	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	1780	180	260	1010	120	70	70	310	60	70	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	1835	186	268	1041	124	72	72	320	62	72	10
RTOR Reduction (vph)	0	0	67	0	0	53	0	0	288	0	0	9
Lane Group Flow (vph)	10	1835	119	268	1041	71	72	72	32	62	72	1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	0.7	57.4	57.4	22.1	78.8	78.8	31.3	13.8	13.8	29.1	11.6	11.6
Effective Green, g (s)	0.7	57.4	57.4	22.1	78.8	78.8	31.3	13.8	13.8	29.1	11.6	11.6
Actuated g/C Ratio	0.01	0.41	0.41	0.16	0.57	0.57	0.23	0.10	0.10	0.21	0.08	0.08
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)	9	2109	657	283	2895	901	400	186	158	372	156	133
v/s Ratio Prot	0.01	c0.36		c0.15	0.20		c0.04	c0.04		0.04	0.04	
v/s Ratio Perm			0.08			0.04			0.02			0.00
v/c Ratio	1.11	0.87	0.18	0.95	0.36	0.08	0.18	0.39	0.20	0.17	0.46	0.01
Uniform Delay, d1	68.9	37.1	25.6	57.6	16.1	13.4	43.2	58.3	57.2	44.7	60.4	58.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	342.2	4.2	0.1	39.0	0.3	0.2	1.0	1.3	0.6	1.0	2.2	0.0
Delay (s)	411.1	41.3	25.8	96.6	16.5	13.6	44.2	59.7	57.9	45.7	62.6	58.1
Level of Service	F	D	C	F	B	B	D	E	E	D	E	E
Approach Delay (s)		41.7			31.2			56.0			55.0	
Approach LOS		D			C			E			E	

Intersection Summary

HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	138.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

Sutter Pointe EIR
 Cumulative Plus Project No PP PM



































												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	1080	1730	170	730	1430	10	160	1020	740	10	1000	930
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1113	1784	175	753	1474	10	165	1052	763	10	1031	959
RTOR Reduction (vph)	0	0	42	0	0	5	0	0	299	0	0	359
Lane Group Flow (vph)	1113	1784	133	753	1474	5	165	1052	464	10	1031	600
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	41.0	49.4	49.4	30.0	38.0	38.0	6.0	48.5	48.5	1.6	44.1	44.1
Effective Green, g (s)	41.0	51.4	51.4	29.6	40.0	40.0	6.0	48.8	48.8	1.6	44.4	44.4
Actuated g/C Ratio	0.28	0.35	0.35	0.20	0.27	0.27	0.04	0.33	0.33	0.01	0.30	0.30
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.3
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	955	1773	552	689	1380	430	140	1684	524	37	1532	477
v/s Ratio Prot	c0.32	c0.35		0.22	0.29		c0.05	0.21		0.00	0.20	
v/s Ratio Perm			0.08			0.00			0.29			c0.38
v/c Ratio	1.17	1.01	0.24	1.09	1.07	0.01	1.18	0.62	0.89	0.27	0.67	1.26
Uniform Delay, d1	53.2	48.0	34.1	58.9	53.7	39.2	70.7	41.6	46.7	72.3	45.1	51.5
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	86.0	22.9	0.1	62.4	44.7	0.0	132.0	0.5	15.9	3.9	0.9	132.0
Delay (s)	139.2	70.9	34.2	121.3	98.4	39.3	202.7	42.1	62.6	76.2	46.1	183.5
Level of Service	F	E	C	F	F	D	F	D	E	E	D	F
Approach Delay (s)		93.5			105.8			63.4			112.1	
Approach LOS		F			F			E			F	

Intersection Summary

HCM Average Control Delay	94.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	147.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	610	1370	70	250	1030	510	30	1080	280	450	1240	460
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	629	1412	72	258	1062	526	31	1113	289	464	1278	474
RTOR Reduction (vph)	0	0	44	0	0	162	0	0	151	0	0	216
Lane Group Flow (vph)	629	1412	28	258	1062	364	31	1113	138	464	1278	258
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	22.0	39.4	39.4	11.6	29.0	29.0	1.8	38.6	38.6	17.0	53.8	53.8
Effective Green, g (s)	22.0	41.4	41.4	11.6	31.0	31.0	1.8	40.6	40.6	17.0	55.8	55.8
Actuated g/C Ratio	0.17	0.33	0.33	0.09	0.24	0.24	0.01	0.32	0.32	0.13	0.44	0.44
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	597	1663	518	315	1245	388	49	1135	508	461	1560	698
v/s Ratio Prot	c0.18	0.28		0.08	0.21		0.01	c0.31		c0.14	0.36	
v/s Ratio Perm			0.02			c0.23			0.09			0.16
v/c Ratio	1.05	0.85	0.05	0.82	0.85	0.94	0.63	0.98	0.27	1.01	0.82	0.37
Uniform Delay, d1	52.3	39.7	29.2	56.5	45.6	46.8	62.1	42.6	32.0	54.8	31.0	23.6
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	51.7	4.7	0.1	14.5	6.4	30.7	17.9	22.2	0.6	43.5	3.9	0.6
Delay (s)	104.0	44.4	29.3	70.9	52.0	77.5	80.0	64.8	32.6	98.3	34.9	24.3
Level of Service	F	D	C	E	D	E	E	E	C	F	C	C
Approach Delay (s)		61.6			61.9			58.6			45.9	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM Average Control Delay			56.5			HCM Level of Service		E				
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			126.6			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			93.3%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	180	90	10	80	540	10	30	20	470	140	90
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	186	93	10	82	557	10	31	21	485	144	93
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	289	649	62	722								
Volume Left (vph)	10	10	10	485								
Volume Right (vph)	93	557	21	93								
Hadj (s)	-0.15	-0.48	-0.13	0.09								
Departure Headway (s)	7.2	6.3	8.3	6.8								
Degree Utilization, x	0.58	1.13	0.14	1.37								
Capacity (veh/h)	485	569	407	516								
Control Delay (s)	19.6	103.1	12.7	199.5								
Approach Delay (s)	19.6	103.1	12.7	199.5								
Approach LOS	C	F	B	F								
Intersection Summary												
Delay			126.3									
HCM Level of Service			F									
Intersection Capacity Utilization			94.1%	ICU Level of Service	F							
Analysis Period (min)			15									

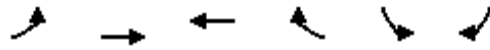
HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

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	1120	40	0	450	370	0	0	660	0	0	130
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	1155	41	0	464	381	0	0	680	0	0	134
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)							851					
pX, platoon unblocked	0.55							0.55	0.55			0.55
vC, conflicting volume	845			1196				1964	2021	1175	2510	1851
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	720			1196				2747	2850	1175	3738	2542
tC, single (s)	4.1			4.1				7.1	6.5	6.2	7.1	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2				3.5	4.0	3.3	3.5	4.0
p0 queue free %	100			100				100	100	0	0	100
cM capacity (veh/h)	486			584				5	9	233	0	15
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1196	845	680	134								
Volume Left	0	0	0	0								
Volume Right	41	381	680	134								
cSH	1700	1700	233	371								
Volume to Capacity	0.70	0.50	2.92	0.36								
Queue Length 95th (ft)	0	0	1504	40								
Control Delay (s)	0.0	0.0	906.3	20.1								
Lane LOS			F	C								
Approach Delay (s)	0.0	0.0	906.3	20.1								
Approach LOS			F	C								
Intersection Summary												
Average Delay			216.9									
Intersection Capacity Utilization			108.9%		ICU Level of Service		G					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM



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	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	1.00	
Flt Protected	0.95	1.00	1.00	1.00	0.95	
Satd. Flow (prot)	1770	3539	1863	1583	1769	
Flt Permitted	0.95	1.00	1.00	1.00	0.95	
Satd. Flow (perm)	1770	3539	1863	1583	1769	
Volume (vph)	130	1650	810	60	310	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	1701	835	62	320	10
RTOR Reduction (vph)	0	0	0	30	2	0
Lane Group Flow (vph)	134	1701	835	32	328	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		4	
Permitted Phases				6		
Actuated Green, G (s)	5.7	45.5	35.8	35.8	16.0	
Effective Green, g (s)	5.7	45.5	35.8	35.8	16.0	
Actuated g/C Ratio	0.08	0.65	0.52	0.52	0.23	
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)	145	2317	960	815	407	
v/s Ratio Prot	0.08	c0.48	c0.45		c0.19	
v/s Ratio Perm				0.02		
v/c Ratio	0.92	0.73	0.87	0.04	0.81	
Uniform Delay, d1	31.7	8.0	14.8	8.3	25.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	52.2	1.2	8.5	0.0	11.1	
Delay (s)	83.8	9.2	23.3	8.4	36.4	
Level of Service	F	A	C	A	D	
Approach Delay (s)		14.7	22.3		36.4	
Approach LOS		B	C		D	

Intersection Summary

HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	69.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM



































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	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)	470	1500	980	230	220	380
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	485	1546	1010	237	227	392
RTOR Reduction (vph)	0	0	0	163	0	291
Lane Group Flow (vph)	485	1546	1010	74	227	101
Turn Type	Prot		Perm		Perm	
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	26.1	58.1	28.0	28.0	23.0	23.0
Effective Green, g (s)	26.1	58.1	28.0	28.0	23.0	23.0
Actuated g/C Ratio	0.29	0.65	0.31	0.31	0.26	0.26
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)	518	2308	1112	497	457	409
v/s Ratio Prot	c0.27	0.44	c0.29		c0.13	
v/s Ratio Perm				0.05		0.06
v/c Ratio	0.94	0.67	0.91	0.15	0.50	0.25
Uniform Delay, d1	30.7	9.6	29.3	22.0	28.1	26.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.5	0.7	12.3	0.6	3.8	1.4
Delay (s)	55.2	10.3	41.7	22.6	31.9	27.6
Level of Service	E	B	D	C	C	C
Approach Delay (s)		21.0	38.0		29.2	
Approach LOS		C	D		C	

Intersection Summary

HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	89.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			


































HCM Signalized Intersection Capacity Analysis
 19: Elverta Rd & 16th St

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

												
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	150	1270	350	110	900	190	250	350	220	220	320	220
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	155	1309	361	113	928	196	258	361	227	227	330	227
RTOR Reduction (vph)	0	0	220	0	0	124	0	0	87	0	0	98
Lane Group Flow (vph)	155	1309	141	113	928	72	258	361	140	227	330	129
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2			1	6			7	4		
Permitted Phases			2				6				8	
Actuated Green, G (s)	5.0	31.6	31.6	3.2	29.8	29.8	7.0	23.0	23.0	7.0	23.0	23.0
Effective Green, g (s)	5.0	31.6	31.6	3.2	29.8	29.8	7.0	23.0	23.0	7.0	23.0	23.0
Actuated g/C Ratio	0.06	0.39	0.39	0.04	0.37	0.37	0.09	0.28	0.28	0.09	0.28	0.28
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)	212	1384	619	136	1305	584	297	1007	451	297	1007	451
v/s Ratio Prot	c0.05	c0.37			0.03	0.26	c0.08		c0.10	0.07		0.09
v/s Ratio Perm			0.09				0.05		0.09		0.08	
v/c Ratio	0.73	0.95	0.23	0.83	0.71	0.12	0.87	0.36	0.31	0.76	0.33	0.29
Uniform Delay, d1	37.2	23.8	16.4	38.5	21.8	16.9	36.4	23.0	22.7	36.1	22.8	22.5
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	12.2	14.3	0.9	33.0	3.3	0.4	22.5	1.0	1.8	11.1	0.9	1.6
Delay (s)	49.4	38.1	17.3	71.5	25.1	17.3	59.0	24.0	24.5	47.2	23.7	24.1
Level of Service	D	D	B	E	C	B	E	C	C	D	C	C
Approach Delay (s)	34.9				28.1		34.8				30.6	
Approach LOS	C				C		C				C	
Intersection Summary												
HCM Average Control Delay			32.4		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			80.8		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			67.8%		ICU Level of Service				C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project No PP PM













												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	810	750	720	280	380	230	730	1230	380	350	1120	760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	835	773	742	289	392	237	753	1268	392	361	1155	784
RTOR Reduction (vph)	0	0	220	0	0	183	0	0	145	0	0	290
Lane Group Flow (vph)	835	773	522	289	392	54	753	1268	247	361	1155	494
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	29.5	48.5	48.5	11.7	31.0	31.0	26.5	46.0	46.0	16.4	35.9	35.9
Effective Green, g (s)	31.0	50.2	50.2	13.2	32.4	32.4	28.0	47.7	47.7	17.9	37.6	37.6
Actuated g/C Ratio	0.21	0.35	0.35	0.09	0.22	0.22	0.19	0.33	0.33	0.12	0.26	0.26
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	734	1760	548	313	1136	354	663	1673	521	424	1319	410
v/s Ratio Prot	c0.24	0.15		0.08	0.08		c0.22	0.25		0.11	0.23	
v/s Ratio Perm			c0.33			0.03			0.16			c0.31
v/c Ratio	1.14	0.44	0.95	0.92	0.35	0.15	1.14	0.76	0.47	0.85	0.88	1.21
Uniform Delay, d1	57.0	36.5	46.2	65.4	47.4	45.3	58.5	43.5	38.7	62.2	51.5	53.7
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	78.0	0.5	27.6	31.2	0.4	0.4	78.7	2.5	1.6	14.6	7.5	113.6
Delay (s)	135.0	37.0	73.9	96.5	47.8	45.7	137.2	46.0	40.3	76.8	58.9	167.3
Level of Service	F	D	E	F	D	D	F	D	D	E	E	F
Approach Delay (s)		83.5			62.6			73.5			98.7	
Approach LOS		F			E			E			F	

Intersection Summary

HCM Average Control Delay	82.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			













HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

													
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		0.95	1.00				0.97		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		5085	1583		3539	1583				3433		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		5085	1583		3539	1583				3433		1583	
Volume (vph)	0	830	110	0	430	370	0	0	0	800	0	270	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	856	113	0	443	381	0	0	0	825	0	278	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	178	
Lane Group Flow (vph)	0	856	113	0	443	381	0	0	0	825	0	100	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		24.2	50.4		24.2	50.4				18.2		18.2	
Effective Green, g (s)		24.2	50.4		24.2	50.4				18.2		18.2	
Actuated g/C Ratio		0.48	1.00		0.48	1.00				0.36		0.36	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2442	1583		1699	1583				1240		572	
v/s Ratio Prot		c0.17			0.13					c0.24			
v/s Ratio Perm			0.07			0.24						0.06	
v/c Ratio		0.35	0.07		0.26	0.24				0.67		0.18	
Uniform Delay, d1		8.2	0.0		7.8	0.0				13.5		11.0	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.1	0.1		0.4	0.4				1.4		0.1	
Delay (s)		8.3	0.1		8.2	0.4				14.9		11.1	
Level of Service		A	A		A	A				B		B	
Approach Delay (s)		7.3			4.6			0.0			13.9		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			9.1									HCM Level of Service	A
HCM Volume to Capacity ratio			0.49										
Actuated Cycle Length (s)			50.4									Sum of lost time (s)	8.0
Intersection Capacity Utilization			45.5%									ICU Level of Service	A
Analysis Period (min)			15										
c	Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

													
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		0.95	1.00		0.91	1.00	0.97		1.00				
Frt		1.00	0.85		1.00	0.85	1.00		0.85				
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00				
Satd. Flow (prot)		3539	1583		5085	1583	3433		1583				
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00				
Satd. Flow (perm)		3539	1583		5085	1583	3433		1583				
Volume (vph)	0	1380	250	0	670	480	120	0	1460	0	0	0	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	1423	258	0	691	495	124	0	1505	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	1423	258	0	691	495	124	0	1505	0	0	0	
Turn Type			Free			Free	Prot		Free				
Protected Phases		2			6		4						
Permitted Phases			Free			Free			Free				
Actuated Green, G (s)		49.1	67.9		49.1	67.9	10.8		67.9				
Effective Green, g (s)		49.1	67.9		49.1	67.9	10.8		67.9				
Actuated g/C Ratio		0.72	1.00		0.72	1.00	0.16		1.00				
Clearance Time (s)		4.0			4.0		4.0						
Vehicle Extension (s)		3.0			3.0		3.0						
Lane Grp Cap (vph)		2559	1583		3677	1583	546		1583				
v/s Ratio Prot		0.40			0.14		0.04						
v/s Ratio Perm			0.16			0.31			c0.95				
v/c Ratio		0.56	0.16		0.19	0.31	0.23		0.95				
Uniform Delay, d1		4.4	0.0		3.0	0.0	24.9		0.0				
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00				
Incremental Delay, d2		0.9	0.2		0.0	0.5	0.2		13.6				
Delay (s)		5.2	0.2		3.0	0.5	25.1		13.6				
Level of Service		A	A		A	A	C		B				
Approach Delay (s)		4.5			2.0			14.5			0.0		
Approach LOS		A			A			B			A		
Intersection Summary													
HCM Average Control Delay			7.4									HCM Level of Service	A
HCM Volume to Capacity ratio			0.95										
Actuated Cycle Length (s)			67.9									Sum of lost time (s)	0.0
Intersection Capacity Utilization			48.2%									ICU Level of Service	A
Analysis Period (min)			15										
c	Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
 Cumulative Plus Project No PP PM

												
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	0.91		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	5085		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		5085	1583	1770	5085		1770		1583			
Volume (vph)	0	1610	160	600	560	0	100	0	910	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1660	165	619	577	0	103	0	938	0	0	0
RTOR Reduction (vph)	0	0	89	0	0	0	0	0	412	0	0	0
Lane Group Flow (vph)	0	1660	76	619	577	0	103	0	526	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		35.5	35.5	38.5	77.5		33.5		33.5			
Effective Green, g (s)		37.0	37.0	38.0	79.0		33.0		33.0			
Actuated g/C Ratio		0.31	0.31	0.32	0.66		0.28		0.28			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		1568	488	561	3348		487		435			
v/s Ratio Prot		c0.33		c0.35	0.11		0.06					
v/s Ratio Perm			0.05						c0.33			
v/c Ratio		1.06	0.16	1.10	0.17		0.21		1.21			
Uniform Delay, d1		41.5	30.1	41.0	7.9		33.5		43.5			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		40.1	0.1	69.5	0.0		0.1		114.1			
Delay (s)		81.6	30.3	110.5	7.9		33.6		157.6			
Level of Service		F	C	F	A		C		F			
Approach Delay (s)		76.9			61.0			145.3			0.0	
Approach LOS		E			E			F			A	
Intersection Summary												
HCM Average Control Delay			89.8			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			94.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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
Lane Util. Factor	1.00	0.91			0.91	1.00				1.00	1.00	1.00
Frt	1.00	1.00			1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	1770	5085			5085	1583				1770	1583	1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	1770	5085			5085	1583				1770	1583	1583
Volume (vph)	630	1800	0	0	1180	40	0	0	0	50	0	50
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	649	1856	0	0	1216	41	0	0	0	52	0	52
RTOR Reduction (vph)	0	0	0	0	0	28	0	0	0	0	0	47
Lane Group Flow (vph)	649	1856	0	0	1216	13	0	0	0	52	0	5
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				8			
Permitted Phases					6							8
Actuated Green, G (s)	31.9	60.3			24.4	24.4				7.4		7.4
Effective Green, g (s)	31.9	60.3			24.4	24.4				7.4		7.4
Actuated g/C Ratio	0.42	0.80			0.32	0.32				0.10		0.10
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)	746	4051			1639	510				173		155
v/s Ratio Prot	c0.37	0.36			c0.24				c0.03			
v/s Ratio Perm						0.01						0.00
v/c Ratio	0.87	0.46			0.74	0.03				0.30		0.03
Uniform Delay, d1	20.0	2.5			22.8	17.5				31.7		30.9
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	10.6	0.1			1.9	0.0				1.0		0.1
Delay (s)	30.6	2.5			24.7	17.5				32.7		31.0
Level of Service	C	A			C	B				C		C
Approach Delay (s)		9.8			24.5			0.0			31.9	
Approach LOS		A			C			A			C	
Intersection Summary												
HCM Average Control Delay			15.2		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			75.7		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			71.0%		ICU Level of Service				C			
Analysis Period (min)			15									
c	Critical Lane Group											
























HCM Signalized Intersection Capacity Analysis
25: Road "O" & Road "H"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.93		1.00	0.93		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1723		1770	1863	1583	1770	1858	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1723		1770	1723		1770	1863	1583	1770	1858	
Volume (vph)	10	10	10	40	10	10	10	440	190	10	580	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	10	41	10	10	10	454	196	10	598	10
RTOR Reduction (vph)	0	10	0	0	10	0	0	0	53	0	0	0
Lane Group Flow (vph)	10	11	0	41	11	0	10	454	143	10	608	0
Turn Type	Prot		Prot				Prot		Perm		Prot	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	0.9	4.0		0.9	4.0		0.9	58.2	58.2	0.9	58.2	
Effective Green, g (s)	0.9	4.0		0.9	4.0		0.9	58.2	58.2	0.9	58.2	
Actuated g/C Ratio	0.01	0.05		0.01	0.05		0.01	0.73	0.73	0.01	0.73	
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)	20	86		20	86		20	1355	1152	20	1352	
v/s Ratio Prot	0.01	c0.01		c0.02	0.01		c0.01	0.24		0.01	c0.33	
v/s Ratio Perm									0.09			
v/c Ratio	0.50	0.12		2.05	0.12		0.50	0.34	0.12	0.50	0.45	
Uniform Delay, d1	39.3	36.3		39.5	36.3		39.3	3.9	3.3	39.3	4.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.3	0.6		608.9	0.6		18.3	0.1	0.0	18.3	0.2	
Delay (s)	57.6	37.0		648.4	37.0		57.6	4.1	3.3	57.6	4.7	
Level of Service	E	D		F	D		E	A	A	E	A	
Approach Delay (s)		43.9			447.9			4.7			5.5	
Approach LOS		D			F			A			A	
Intersection Summary												
HCM Average Control Delay			25.7	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			80.0	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			46.7%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
26: Road "O" & Road "C"































Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1818		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1818		1770	3539	1583	1770	3539	1583
Volume (vph)	80	80	560	320	50	10	330	120	410	20	330	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	82	577	330	52	10	340	124	423	21	340	10
RTOR Reduction (vph)	0	0	317	0	7	0	0	0	265	0	0	8
Lane Group Flow (vph)	82	82	260	330	55	0	340	124	158	21	340	2
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases			4						2			6
Actuated Green, G (s)	11.9	17.9	17.9	16.3	22.3		17.3	30.9	30.9	1.8	15.4	15.4
Effective Green, g (s)	11.9	17.9	17.9	16.3	22.3		17.3	30.9	30.9	1.8	15.4	15.4
Actuated g/C Ratio	0.14	0.22	0.22	0.20	0.27		0.21	0.37	0.37	0.02	0.19	0.19
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)	254	402	342	348	489		369	1319	590	38	657	294
v/s Ratio Prot	0.05	0.04		c0.19	0.03		c0.19	0.04		0.01	c0.10	
v/s Ratio Perm			c0.16						0.10			0.00
v/c Ratio	0.32	0.20	0.76	0.95	0.11		0.92	0.09	0.27	0.55	0.52	0.01
Uniform Delay, d1	31.9	26.7	30.5	32.9	22.8		32.1	16.9	18.1	40.2	30.4	27.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3	9.6	34.5	0.1		27.9	0.0	0.2	16.2	0.7	0.0
Delay (s)	32.6	26.9	40.1	67.4	22.9		60.0	16.9	18.4	56.4	31.1	27.5
Level of Service	C	C	D	E	C		E	B	B	E	C	C
Approach Delay (s)		37.8			60.4			34.1			32.4	
Approach LOS		D			E			C			C	

Intersection Summary		
HCM Average Control Delay	39.3	HCM Level of Service D
HCM Volume to Capacity ratio	0.79	
Actuated Cycle Length (s)	82.9	Sum of lost time (s) 16.0
Intersection Capacity Utilization	71.5%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
29: Road "K" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Volume (vph)	540	130	410	180	100	210	310	520	220	190	450	210
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	557	134	423	186	103	216	320	536	227	196	464	216
RTOR Reduction (vph)	0	0	249	0	0	180	0	0	141	0	0	134
Lane Group Flow (vph)	557	134	174	186	103	36	320	536	86	196	464	82
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	12.1	14.5	14.5	11.0	13.4	13.4	8.1	30.3	30.3	8.1	30.3	30.3
Effective Green, g (s)	12.1	14.5	14.5	11.0	13.4	13.4	8.1	30.3	30.3	8.1	30.3	30.3
Actuated g/C Ratio	0.15	0.18	0.18	0.14	0.17	0.17	0.10	0.38	0.38	0.10	0.38	0.38
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)	520	642	287	244	594	265	348	1342	600	179	1342	600
v/s Ratio Prot	c0.16	0.04		0.11	0.03		0.09	c0.15		c0.11	0.13	
v/s Ratio Perm			c0.11			0.02			0.05			0.05
v/c Ratio	1.07	0.21	0.61	0.76	0.17	0.14	0.92	0.40	0.14	1.09	0.35	0.14
Uniform Delay, d1	33.9	27.8	30.1	33.2	28.5	28.3	35.6	18.1	16.3	35.9	17.7	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	59.9	0.2	3.6	13.1	0.1	0.2	28.4	0.9	0.5	94.9	0.7	0.5
Delay (s)	93.8	28.0	33.7	46.3	28.6	28.6	63.9	19.0	16.8	130.8	18.4	16.7
Level of Service	F	C	C	D	C	C	E	B	B	F	B	B
Approach Delay (s)		63.0			35.1			31.8			43.2	
Approach LOS		E			D			C			D	

Intersection Summary

HCM Average Control Delay	44.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	79.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
30: Road "J" & Road "H"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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	0.95	1.00	1.00	0.95	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	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	80	200	30	60	270	410	60	100	110	200	190	130
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	206	31	62	278	423	62	103	113	206	196	134
RTOR Reduction (vph)	0	0	20	0	0	264	0	0	97	0	0	100
Lane Group Flow (vph)	82	206	11	62	278	159	62	103	16	206	196	34
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	3.8	22.7	22.7	5.2	24.1	24.1	3.9	9.2	9.2	10.9	16.2	16.2
Effective Green, g (s)	3.8	22.7	22.7	5.2	24.1	24.1	3.9	9.2	9.2	10.9	16.2	16.2
Actuated g/C Ratio	0.06	0.35	0.35	0.08	0.38	0.38	0.06	0.14	0.14	0.17	0.25	0.25
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)	105	661	561	144	702	596	108	509	228	301	896	401
v/s Ratio Prot	c0.05	0.11		0.04	c0.15		0.04	0.03		c0.12	c0.06	
v/s Ratio Perm			0.01			0.10			0.01			0.02
v/c Ratio	0.78	0.31	0.02	0.43	0.40	0.27	0.57	0.20	0.07	0.68	0.22	0.08
Uniform Delay, d1	29.7	15.0	13.4	28.0	14.6	13.8	29.2	24.2	23.7	24.9	18.9	18.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.4	1.2	0.1	9.1	1.7	1.1	7.2	0.2	0.1	6.3	0.1	0.1
Delay (s)	60.1	16.2	13.5	37.1	16.3	14.9	36.4	24.4	23.8	31.2	19.0	18.3
Level of Service	E	B	B	D	B	B	D	C	C	C	B	B
Approach Delay (s)		27.2			17.2			26.8			23.5	
Approach LOS		C			B			C			C	

Intersection Summary

HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			














HCM Unsignalized Intersection Capacity Analysis
31: Road "J" & Road "L"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	220	50	140	310	80	90
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	227	52	144	320	82	93
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			278		835	227
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			278		835	227
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		72	89
cM capacity (veh/h)			1284		300	813
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	227	52	144	320	82	93
Volume Left	0	0	144	0	82	0
Volume Right	0	52	0	0	0	93
cSH	1700	1700	1284	1700	300	813
Volume to Capacity	0.13	0.03	0.11	0.19	0.28	0.11
Queue Length 95th (ft)	0	0	9	0	27	10
Control Delay (s)	0.0	0.0	8.2	0.0	21.5	10.0
Lane LOS			A		C	B
Approach Delay (s)	0.0		2.5		15.4	
Approach LOS					C	
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			33.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
32: Road "M" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3534		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3534		1770	3539
Volume (vph)	10	70	1030	10	120	890
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	72	1062	10	124	918
RTOR Reduction (vph)	0	64	1	0	0	0
Lane Group Flow (vph)	10	8	1071	0	124	918
Turn Type	Perm			Prot		
Protected Phases	8		2		1	6
Permitted Phases	8					
Actuated Green, G (s)	7.0	7.0	37.9		6.4	48.3
Effective Green, g (s)	7.0	7.0	37.9		6.4	48.3
Actuated g/C Ratio	0.11	0.11	0.60		0.10	0.76
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)	196	175	2116		179	2700
v/s Ratio Prot	c0.01		c0.30		c0.07	0.26
v/s Ratio Perm	0.01					
v/c Ratio	0.05	0.05	0.51		0.69	0.34
Uniform Delay, d1	25.2	25.2	7.3		27.5	2.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.1	0.9		11.0	0.3
Delay (s)	25.3	25.3	8.2		38.5	2.7
Level of Service	C	C	A		D	A
Approach Delay (s)	25.3		8.2			7.0
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			8.3	HCM Level of Service		A
HCM Volume to Capacity ratio			0.47			
Actuated Cycle Length (s)			63.3	Sum of lost time (s)	12.0	
Intersection Capacity Utilization			48.8%	ICU Level of Service	A	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
33: Road "M" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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)	10	10	120	10	10	10	70	10	10	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	124	10	10	10	72	10	10	10	10	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)		1190										
pX, platoon unblocked												
vC, conflicting volume	21			134			82	72	10	82	191	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	21			134			82	72	10	82	191	15
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 %	99			99			92	99	99	99	99	99
cM capacity (veh/h)	1595			1451			877	807	1071	878	695	1064
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1						
Volume Total	21	124	31	72	21	31						
Volume Left	10	0	10	72	0	10						
Volume Right	0	124	10	0	10	10						
cSH	1595	1700	1451	877	921	853						
Volume to Capacity	0.01	0.07	0.01	0.08	0.02	0.04						
Queue Length 95th (ft)	0	0	1	7	2	3						
Control Delay (s)	3.7	0.0	2.5	9.5	9.0	9.4						
Lane LOS	A		A	A	A	A						
Approach Delay (s)	0.5		2.5	9.4		9.4						
Approach LOS				A		A						
Intersection Summary												
Average Delay			4.4									
Intersection Capacity Utilization			24.7%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 34: Road "M" & Road "G"















Sutter Pointe EIR
 Cumulative Plus Project No PP PM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T	T	
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	10	10	20	30	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	21	31	10
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	77	36	41			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	77	36	41			
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)	920	1036	1568			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	21	31	41			
Volume Left	10	10	0			
Volume Right	10	0	10			
cSH	974	1568	1700			
Volume to Capacity	0.02	0.01	0.02			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	8.8	2.5	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	2.5	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			18.3%	ICU Level of Service	A	
Analysis Period (min)			15			























HCM Signalized Intersection Capacity Analysis
35: Road "D" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	210	600	430	320	490	400
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	216	619	443	330	505	412
RTOR Reduction (vph)	0	492	0	223	0	0
Lane Group Flow (vph)	216	127	443	107	505	412
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	16.5	16.5	26.2	26.2	26.1	56.3
Effective Green, g (s)	16.5	16.5	26.2	26.2	26.1	56.3
Actuated g/C Ratio	0.20	0.20	0.32	0.32	0.32	0.70
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)	361	323	1148	513	572	2466
v/s Ratio Prot	c0.12		c0.13		c0.29	0.12
v/s Ratio Perm		0.08		0.07		
v/c Ratio	0.60	0.39	0.39	0.21	0.88	0.17
Uniform Delay, d1	29.1	27.8	21.1	19.8	25.9	4.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	0.8	1.0	0.9	17.7	0.1
Delay (s)	31.8	28.6	22.1	20.7	43.6	4.4
Level of Service	C	C	C	C	D	A
Approach Delay (s)	29.4		21.5			26.0
Approach LOS	C		C			C
Intersection Summary						
HCM Average Control Delay			25.8		HCM Level of Service	C
HCM Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			80.8		Sum of lost time (s)	12.0
Intersection Capacity Utilization			60.7%		ICU Level of Service	B
Analysis Period (min)			15			
c	Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
36: Road "D" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1857		1770	1863	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1857		1770	1863	1583	1770	1723		1770	1863	1583
Volume (vph)	310	500	10	10	630	120	10	10	10	90	10	190
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	320	515	10	10	649	124	10	10	10	93	10	196
RTOR Reduction (vph)	0	1	0	0	0	76	0	9	0	0	0	168
Lane Group Flow (vph)	320	524	0	10	649	48	10	11	0	93	10	28
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases						6						8
Actuated Green, G (s)	16.7	43.1		4.1	30.5	30.5	4.1	4.4		10.7	11.0	11.0
Effective Green, g (s)	16.7	43.1		4.1	30.5	30.5	4.1	4.4		10.7	11.0	11.0
Actuated g/C Ratio	0.21	0.55		0.05	0.39	0.39	0.05	0.06		0.14	0.14	0.14
Clearance Time (s)	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
Lane Grp Cap (vph)	378	1022		93	726	617	93	97		242	262	222
v/s Ratio Prot	c0.18	0.28		0.01	c0.35		0.01	0.01		c0.05	0.01	
v/s Ratio Perm						0.03						c0.02
v/c Ratio	0.85	0.51		0.11	0.89	0.08	0.11	0.11		0.38	0.04	0.12
Uniform Delay, d1	29.6	11.0		35.4	22.4	15.0	35.4	35.1		30.8	29.1	29.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.9	0.4		0.5	13.4	0.1	0.5	0.5		1.0	0.1	0.3
Delay (s)	45.5	11.5		35.9	35.8	15.1	35.9	35.6		31.8	29.1	29.7
Level of Service	D	B		D	D	B	D	D		C	C	C
Approach Delay (s)		24.3			32.5			35.7			30.3	
Approach LOS		C			C			D			C	

Intersection Summary

HCM Average Control Delay	28.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	78.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
37: Road "J" & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	60	150	220	60	250	410
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	62	155	227	62	258	423
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			216		577	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			216		577	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			83		35	58
cM capacity (veh/h)			1353		398	1003
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	62	155	227	62	258	423
Volume Left	0	0	227	0	258	0
Volume Right	0	155	0	0	0	423
cSH	1700	1700	1353	1700	398	1003
Volume to Capacity	0.04	0.09	0.17	0.04	0.65	0.42
Queue Length 95th (ft)	0	0	15	0	110	53
Control Delay (s)	0.0	0.0	8.2	0.0	29.2	11.2
Lane LOS			A		D	B
Approach Delay (s)	0.0		6.4		18.0	
Approach LOS					C	
Intersection Summary						
Average Delay	11.9					
Intersection Capacity Utilization	39.4%		ICU Level of Service			A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 38: Road "J" & Road "L"

Sutter Pointe EIR
 Cumulative Plus Project No PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Sign Control		Stop	Stop		Stop	
Volume (vph)	430	40	50	150	110	240
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	443	41	52	155	113	247
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total (vph)	443	41	52	155	113	247
Volume Left (vph)	443	0	0	0	113	0
Volume Right (vph)	0	0	0	155	0	247
Hadj (s)	0.53	0.03	0.03	-0.67	0.53	-0.67
Departure Headway (s)	6.4	5.9	6.3	5.6	6.9	5.8
Degree Utilization, x	0.79	0.07	0.09	0.24	0.22	0.40
Capacity (veh/h)	552	585	534	602	489	589
Control Delay (s)	28.0	8.1	8.8	9.2	10.7	11.3
Approach Delay (s)	26.3		9.1		11.1	
Approach LOS	D		A		B	
Intersection Summary						
Delay			17.7			
HCM Level of Service			C			
Intersection Capacity Utilization			43.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
39: Road "J" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project No PP PM
























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	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3524	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3524	
Volume (vph)	10	100	30	80	90	50	80	600	120	170	670	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	103	31	82	93	52	82	619	124	175	691	21
RTOR Reduction (vph)	0	0	27	0	0	41	0	0	87	0	1	0
Lane Group Flow (vph)	10	103	4	82	93	11	82	619	37	175	711	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	1.2	12.5	12.5	7.8	19.1	19.1	27.0	27.0	27.0	27.0	27.0	27.0
Effective Green, g (s)	1.2	12.5	12.5	7.8	19.1	19.1	27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.01	0.14	0.14	0.09	0.21	0.21	0.30	0.30	0.30	0.30	0.30	0.30
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)	24	258	219	153	394	335	529	1058	473	529	1054	
v/s Ratio Prot	0.01	c0.06		c0.05	0.05		0.05	0.17		c0.10	c0.20	
v/s Ratio Perm			0.00			0.01			0.02			
v/c Ratio	0.42	0.40	0.02	0.54	0.24	0.03	0.16	0.59	0.08	0.33	0.67	
Uniform Delay, d1	44.2	35.5	33.6	39.5	29.5	28.3	23.3	26.9	22.7	24.6	27.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.3	1.0	0.0	3.6	0.3	0.0	0.6	2.4	0.3	1.7	3.5	
Delay (s)	55.5	36.5	33.6	43.1	29.9	28.3	23.9	29.3	23.0	26.3	31.2	
Level of Service	E	D	C	D	C	C	C	C	C	C	C	
Approach Delay (s)		37.2			34.3			27.8			30.3	
Approach LOS		D			C			C			C	

Intersection Summary

HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			















HCM Signalized Intersection Capacity Analysis
40: Road "J" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3532		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3532		1770	3539	1583
Volume (vph)	80	10	180	10	10	10	80	750	10	10	570	80
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	10	186	10	10	10	82	773	10	10	588	82
RTOR Reduction (vph)	0	0	153	0	9	0	0	1	0	0	0	45
Lane Group Flow (vph)	82	10	33	10	11	0	82	782	0	10	588	37
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	3.8	9.1	9.1	0.6	5.9		2.6	24.8		0.6	22.8	22.8
Effective Green, g (s)	3.8	9.1	9.1	0.6	5.9		2.6	24.8		0.6	22.8	22.8
Actuated g/C Ratio	0.07	0.18	0.18	0.01	0.12		0.05	0.49		0.01	0.45	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
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	132	332	282	21	199		90	1714		21	1579	706
v/s Ratio Prot	c0.05	0.01		0.01	0.01		c0.05	c0.22		0.01	0.17	
v/s Ratio Perm			c0.02									0.02
v/c Ratio	0.62	0.03	0.12	0.48	0.06		0.91	0.46		0.48	0.37	0.05
Uniform Delay, d1	23.0	17.4	17.6	25.1	20.1		24.1	8.7		25.1	9.4	8.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.8	0.0	0.2	16.0	0.1		66.1	0.2		16.0	0.1	0.0
Delay (s)	31.7	17.4	17.8	41.1	20.2		90.3	8.9		41.1	9.5	8.1
Level of Service	C	B	B	D	C		F	A		D	A	A
Approach Delay (s)		21.9			27.2			16.6			9.8	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM Average Control Delay			15.1				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			51.1				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			45.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
41: Road "G" & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	190	20	920	340	30	520
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	196	21	948	351	31	536
RTOR Reduction (vph)	0	16	0	173	0	0
Lane Group Flow (vph)	196	5	948	178	31	536
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	11.8	11.8	25.8	25.8	1.4	31.2
Effective Green, g (s)	11.8	11.8	25.8	25.8	1.4	31.2
Actuated g/C Ratio	0.23	0.23	0.51	0.51	0.03	0.61
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)	410	366	1790	801	49	2165
v/s Ratio Prot	c0.11		c0.27		c0.02	0.15
v/s Ratio Perm		0.00		0.11		
v/c Ratio	0.48	0.01	0.53	0.22	0.63	0.25
Uniform Delay, d1	16.9	15.1	8.5	7.0	24.5	4.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.0	0.3	0.1	23.7	0.1
Delay (s)	17.8	15.1	8.8	7.2	48.2	4.6
Level of Service	B	B	A	A	D	A
Approach Delay (s)	17.6		8.3			7.0
Approach LOS	B		A			A
Intersection Summary						
HCM Average Control Delay			8.9		HCM Level of Service	A
HCM Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			51.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			42.6%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						























HCM Signalized Intersection Capacity Analysis
42: Road "G" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1816		1770	1836		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1816		1770	1836		1770	3539	1583	1770	3539	1583
Volume (vph)	120	150	30	60	90	10	50	640	120	10	640	90
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	155	31	62	93	10	52	660	124	10	660	93
RTOR Reduction (vph)	0	13	0	0	8	0	0	0	88	0	0	66
Lane Group Flow (vph)	124	173	0	62	95	0	52	660	36	10	660	27
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases									2			6
Actuated Green, G (s)	5.7	10.8		2.0	7.1		4.4	13.7	13.7	4.4	13.7	13.7
Effective Green, g (s)	5.7	10.8		2.0	7.1		4.4	13.7	13.7	4.4	13.7	13.7
Actuated g/C Ratio	0.12	0.23		0.04	0.15		0.09	0.29	0.29	0.09	0.29	0.29
Clearance Time (s)	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
Lane Grp Cap (vph)	215	418		75	278		166	1034	462	166	1034	462
v/s Ratio Prot	c0.07	c0.10		0.04	0.05		c0.03	c0.19		0.01	0.19	
v/s Ratio Perm									0.02			0.02
v/c Ratio	0.58	0.41		0.83	0.34		0.31	0.64	0.08	0.06	0.64	0.06
Uniform Delay, d1	19.5	15.4		22.3	17.8		19.8	14.4	12.0	19.4	14.4	12.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	0.7		49.8	0.7		1.1	1.3	0.1	0.2	1.3	0.1
Delay (s)	23.2	16.0		72.0	18.6		20.9	15.7	12.1	19.5	15.7	12.0
Level of Service	C	B		E	B		C	B	B	B	B	B
Approach Delay (s)		18.9			38.6			15.5			15.3	
Approach LOS		B			D			B			B	
Intersection Summary												
HCM Average Control Delay			17.8				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			46.9				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			47.4%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
43: Road "G" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1818		1770	1688		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1818		1770	1688		1770	3539	1583	1770	3539	1583
Volume (vph)	80	50	10	190	30	50	10	680	220	80	560	60
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	52	10	196	31	52	10	701	227	82	577	62
RTOR Reduction (vph)	0	9	0	0	41	0	0	0	159	0	0	43
Lane Group Flow (vph)	82	53	0	196	42	0	10	701	68	82	577	19
Turn Type	Prot			Prot			Prot			Perm	Prot	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.0	5.9		8.7	10.6		4.3	15.0	15.0	4.3	15.0	15.0
Effective Green, g (s)	4.0	5.9		8.7	10.6		4.3	15.0	15.0	4.3	15.0	15.0
Actuated g/C Ratio	0.08	0.12		0.17	0.21		0.09	0.30	0.30	0.09	0.30	0.30
Clearance Time (s)	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
Lane Grp Cap (vph)	142	215		309	359		153	1064	476	153	1064	476
v/s Ratio Prot	0.05	c0.03		c0.11	0.02		0.01	c0.20		c0.05	0.16	
v/s Ratio Perm									0.04			0.01
v/c Ratio	0.58	0.25		0.63	0.12		0.07	0.66	0.14	0.54	0.54	0.04
Uniform Delay, d1	22.1	20.0		19.1	15.9		21.0	15.2	12.8	21.8	14.6	12.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.6	0.6		4.2	0.1		0.2	1.5	0.1	3.6	0.6	0.0
Delay (s)	27.7	20.6		23.3	16.0		21.1	16.7	12.9	25.4	15.1	12.4
Level of Service	C	C		C	B		C	B	B	C	B	B
Approach Delay (s)		24.7			21.2			15.8			16.1	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			17.2			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			49.9			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			50.4%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
44: Road "G" & Road "D"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.93		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1638		1770	1723		1770	3532		1770	3530	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1638		1770	1723		1770	3532		1770	3530	
Volume (vph)	10	10	40	10	10	10	60	750	10	10	580	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	41	10	10	10	62	773	10	10	598	10
RTOR Reduction (vph)	0	37	0	0	9	0	0	1	0	0	1	0
Lane Group Flow (vph)	10	14	0	10	11	0	62	782	0	10	607	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	6.4		0.7	6.4		2.1	43.4		0.7	42.0	
Effective Green, g (s)	0.7	6.4		0.7	6.4		2.1	43.4		0.7	42.0	
Actuated g/C Ratio	0.01	0.10		0.01	0.10		0.03	0.65		0.01	0.62	
Clearance Time (s)	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	
Lane Grp Cap (vph)	18	156		18	164		55	2281		18	2206	
v/s Ratio Prot	c0.01	c0.01		0.01	0.01		c0.04	c0.22		0.01	0.17	
v/s Ratio Perm												
v/c Ratio	0.56	0.09		0.56	0.07		1.13	0.34		0.56	0.28	
Uniform Delay, d1	33.1	27.7		33.1	27.7		32.6	5.4		33.1	5.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.3	0.2		32.3	0.2		160.6	0.1		32.3	0.1	
Delay (s)	65.4	28.0		65.4	27.9		193.2	5.5		65.4	5.8	
Level of Service	E	C		E	C		F	A		E	A	
Approach Delay (s)		34.1			40.4			19.3			6.7	
Approach LOS		C			D			B			A	
Intersection Summary												
HCM Average Control Delay			15.3				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			67.2				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			41.6%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
45: Riego Rd & Road "U"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00		
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1770	3527		1770	3539	1583	1770	1863	1583	1770	1640		
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1770	3527		1770	3539	1583	1770	1863	1583	1770	1640		
Volume (vph)	30	420	10	190	490	190	10	20	320	330	20	80	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	31	433	10	196	505	196	10	21	330	340	21	82	
RTOR Reduction (vph)	0	1	0	0	0	146	0	0	294	0	75	0	
Lane Group Flow (vph)	31	442	0	196	505	50	10	21	36	340	28	0	
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot			
Protected Phases	5	2		1	6		7	4		3	8		
Permitted Phases						6			4				
Actuated Green, G (s)	26.2	26.2		26.2	26.2	26.2	26.3	11.4	11.4	23.4	8.5		
Effective Green, g (s)	26.2	26.2		26.2	26.2	26.2	26.3	11.4	11.4	23.4	8.5		
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.25	0.11	0.11	0.23	0.08		
Clearance Time (s)	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		
Lane Grp Cap (vph)	449	895		449	898	402	451	206	175	401	135		
v/s Ratio Prot	0.02	0.13		c0.11	c0.14		0.01	0.01		c0.19	0.02		
v/s Ratio Perm						0.03			c0.02				
v/c Ratio	0.07	0.49		0.44	0.56	0.12	0.02	0.10	0.21	0.85	0.21		
Uniform Delay, d1	29.2	32.8		32.3	33.5	29.7	28.8	41.3	41.8	38.2	44.2		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	1.9		3.1	2.5	0.6	0.1	0.2	0.6	15.2	0.8		
Delay (s)	29.5	34.8		35.4	36.1	30.3	28.9	41.5	42.4	53.4	45.0		
Level of Service	C	C		D	D	C	C	D	D	D	D		
Approach Delay (s)		34.4			34.6			42.0			51.5		
Approach LOS		C			C			D			D		
Intersection Summary													
HCM Average Control Delay			39.2									HCM Level of Service	D
HCM Volume to Capacity ratio			0.55										
Actuated Cycle Length (s)			103.2									Sum of lost time (s)	16.0
Intersection Capacity Utilization			60.0%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												
































HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1824		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1824		1770	1863	1583
Volume (vph)	170	1010	50	10	700	200	40	60	10	410	40	200
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	175	1041	52	10	722	206	41	62	10	423	41	206
RTOR Reduction (vph)	0	0	26	0	0	125	0	5	0	0	0	148
Lane Group Flow (vph)	175	1041	26	10	722	81	41	67	0	423	41	58
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6						8
Actuated Green, G (s)	17.2	40.2	40.2	26.1	49.1	49.1	7.1	10.1		32.2	35.2	35.2
Effective Green, g (s)	17.2	40.2	40.2	26.1	49.1	49.1	7.1	10.1		32.2	35.2	35.2
Actuated g/C Ratio	0.14	0.32	0.32	0.21	0.39	0.39	0.06	0.08		0.26	0.28	0.28
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)	244	1142	511	371	1395	624	101	148		457	526	447
v/s Ratio Prot	c0.10	c0.29		0.01	c0.20		0.02	c0.04		c0.24	0.02	
v/s Ratio Perm			0.02			0.05						0.04
v/c Ratio	0.72	0.91	0.05	0.03	0.52	0.13	0.41	0.46		0.93	0.08	0.13
Uniform Delay, d1	51.4	40.5	29.1	39.2	28.7	24.1	56.7	54.6		45.0	32.8	33.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.6	12.4	0.2	0.1	1.4	0.4	2.7	2.2		27.1	0.1	0.1
Delay (s)	61.0	52.9	29.3	39.3	30.1	24.5	59.4	56.8		72.1	32.9	33.4
Level of Service	E	D	C	D	C	C	E	E		E	C	C
Approach Delay (s)		53.0			29.0			57.8			57.8	
Approach LOS		D			C			E			E	
Intersection Summary												
HCM Average Control Delay			46.7			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			124.6			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			70.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	730	1630	140	130	1330	130	180	210	130	170	220	460
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	753	1680	144	134	1371	134	186	216	134	175	227	474
RTOR Reduction (vph)	0	0	62	0	0	76	0	0	112	0	0	320
Lane Group Flow (vph)	753	1680	82	134	1371	58	186	216	22	175	227	154
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	28.2	52.6	52.6	11.9	36.3	36.3	14.1	18.5	18.5	13.1	17.5	17.5
Effective Green, g (s)	28.2	52.6	52.6	11.9	36.3	36.3	14.1	18.5	18.5	13.1	17.5	17.5
Actuated g/C Ratio	0.25	0.47	0.47	0.11	0.32	0.32	0.13	0.17	0.17	0.12	0.16	0.16
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)	864	2386	743	188	1647	513	223	584	261	207	552	247
v/s Ratio Prot	c0.22	0.33		0.08	c0.27		c0.11	0.06		0.10	0.06	
v/s Ratio Perm			0.05			0.04			0.01			c0.10
v/c Ratio	0.87	0.70	0.11	0.71	0.83	0.11	0.83	0.37	0.08	0.85	0.41	0.62
Uniform Delay, d1	40.2	23.6	16.7	48.4	35.1	26.6	47.9	41.6	39.6	48.5	42.7	44.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.6	1.8	0.3	12.0	5.1	0.4	22.7	0.4	0.1	25.8	0.5	4.8
Delay (s)	49.8	25.4	17.0	60.5	40.2	27.1	70.5	42.0	39.8	74.3	43.2	49.1
Level of Service	D	C	B	E	D	C	E	D	D	E	D	D
Approach Delay (s)		32.0			40.8			51.3			52.6	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM Average Control Delay		39.6			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		112.1			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		75.9%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.97	0.95	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	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	310	1120	200	240	950	500	180	260	280	670	270	110
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	320	1155	206	247	979	515	186	268	289	691	278	113
RTOR Reduction (vph)	0	0	125	0	0	324	0	0	248	0	0	88
Lane Group Flow (vph)	320	1155	81	247	979	191	186	268	41	691	278	25
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	25.1	40.6	40.6	20.7	36.2	36.2	17.2	17.4	17.4	27.1	27.3	27.3
Effective Green, g (s)	25.1	40.6	40.6	20.7	36.2	36.2	17.2	17.4	17.4	27.1	27.3	27.3
Actuated g/C Ratio	0.21	0.33	0.33	0.17	0.30	0.30	0.14	0.14	0.14	0.22	0.22	0.22
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)	365	1695	528	301	1511	470	250	506	226	764	793	355
v/s Ratio Prot	c0.18	c0.23		0.14	0.19		0.11	c0.08		c0.20	0.08	
v/s Ratio Perm			0.05			0.12			0.03			0.02
v/c Ratio	0.88	0.68	0.15	0.82	0.65	0.41	0.74	0.53	0.18	0.90	0.35	0.07
Uniform Delay, d1	46.9	35.0	28.5	48.8	37.3	34.2	50.2	48.4	45.9	46.1	39.8	37.3
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	20.3	2.2	0.6	16.2	2.2	2.6	11.4	1.0	0.4	16.2	0.3	0.1
Delay (s)	67.2	37.3	29.2	65.0	39.4	36.8	61.5	49.4	46.3	62.3	40.1	37.3
Level of Service	E	D	C	E	D	D	E	D	D	E	D	D
Approach Delay (s)		42.0			42.3			51.2			54.0	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			45.9	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			121.8	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			75.2%	ICU Level of Service				D				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
53: Road "T" & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project No PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	480	20	270	280	10	220
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	495	21	278	289	10	227
RTOR Reduction (vph)	0	13	0	215	0	0
Lane Group Flow (vph)	495	8	278	74	10	227
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	18.2	18.2	12.4	12.4	5.9	22.3
Effective Green, g (s)	18.2	18.2	12.4	12.4	5.9	22.3
Actuated g/C Ratio	0.38	0.38	0.26	0.26	0.12	0.46
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)	664	594	476	405	215	857
v/s Ratio Prot	c0.28		c0.15		0.01	c0.12
v/s Ratio Perm		0.00		0.05		
v/c Ratio	0.75	0.01	0.58	0.18	0.05	0.26
Uniform Delay, d1	13.1	9.5	15.8	14.1	18.8	8.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.0	1.8	0.2	0.1	0.2
Delay (s)	17.7	9.5	17.6	14.3	18.9	8.2
Level of Service	B	A	B	B	B	A
Approach Delay (s)	17.4		15.9			8.7
Approach LOS	B		B			A
Intersection Summary						
HCM Average Control Delay			15.2		HCM Level of Service	B
HCM Volume to Capacity ratio			0.62			
Actuated Cycle Length (s)			48.5		Sum of lost time (s)	12.0
Intersection Capacity Utilization			47.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 54: Road "T" & Road "U"

Sutter Pointe EIR
 Cumulative Plus Project No PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↙	↘
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	60	170	200	10	10	100
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	62	175	206	10	10	103
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	216				510	211
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216				510	211
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				98	88
cM capacity (veh/h)	1353				499	829
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2	
Volume Total	62	175	216	10	103	
Volume Left	62	0	0	10	0	
Volume Right	0	0	10	0	103	
cSH	1353	1700	1700	499	829	
Volume to Capacity	0.05	0.10	0.13	0.02	0.12	
Queue Length 95th (ft)	4	0	0	2	11	
Control Delay (s)	7.8	0.0	0.0	12.4	10.0	
Lane LOS	A			B	A	
Approach Delay (s)	2.0		0.0	10.2		
Approach LOS				B		
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			27.8%		ICU Level of Service	A
Analysis Period (min)			15			

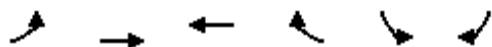
HCM Unsignalized Intersection Capacity Analysis
55: Road "Q" & Road "R"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↶	↷	↶	↶
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	60	20	100	170	10	40
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	62	21	103	175	10	41
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	165	103			278	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	165	103			278	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			99	
cM capacity (veh/h)	819	952			1284	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	62	21	103	175	10	41
Volume Left	62	0	0	0	10	0
Volume Right	0	21	0	175	0	0
cSH	819	952	1700	1700	1284	1700
Volume to Capacity	0.08	0.02	0.06	0.10	0.01	0.02
Queue Length 95th (ft)	6	2	0	0	1	0
Control Delay (s)	9.8	8.9	0.0	0.0	7.8	0.0
Lane LOS	A	A			A	
Approach Delay (s)	9.5		0.0		1.6	
Approach LOS	A					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			20.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
56: Road "T" & Road "R"

Sutter Pointe EIR
Cumulative Plus Project No PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗	↑	↖	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	180	60	90	80	20	80
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	186	62	93	82	21	82
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	175				526	93
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175				526	93
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				95	91
cM capacity (veh/h)	1401				445	964
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	186	62	93	82	21	82
Volume Left	186	0	0	0	21	0
Volume Right	0	0	0	82	0	82
cSH	1401	1700	1700	1700	445	964
Volume to Capacity	0.13	0.04	0.05	0.05	0.05	0.09
Queue Length 95th (ft)	11	0	0	0	4	7
Control Delay (s)	8.0	0.0	0.0	0.0	13.5	9.1
Lane LOS	A				B	A
Approach Delay (s)	6.0		0.0		10.0	
Approach LOS					A	
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			26.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
57: Road "Q" & Road "S"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1840		1770	1863	1583	1770	1863	1583	1770	1853	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1840		1770	1863	1583	1770	1863	1583	1770	1853	
Volume (vph)	10	230	20	200	120	10	20	390	400	120	270	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	237	21	206	124	10	21	402	412	124	278	10
RTOR Reduction (vph)	0	3	0	0	0	6	0	0	307	0	1	0
Lane Group Flow (vph)	10	255	0	206	124	4	21	402	105	124	287	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	0.7	19.8		15.2	34.3	34.3	20.1	24.2	24.2	20.1	24.2	
Effective Green, g (s)	0.7	19.8		15.2	34.3	34.3	20.1	24.2	24.2	20.1	24.2	
Actuated g/C Ratio	0.01	0.21		0.16	0.36	0.36	0.21	0.25	0.25	0.21	0.25	
Clearance Time (s)	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	
Lane Grp Cap (vph)	13	382		282	671	570	373	473	402	373	471	
v/s Ratio Prot	0.01	c0.14		c0.12	0.07		0.01	c0.22		c0.07	0.15	
v/s Ratio Perm						0.00			0.07			
v/c Ratio	0.77	0.67		0.73	0.18	0.01	0.06	0.85	0.26	0.33	0.61	
Uniform Delay, d1	47.2	34.7		38.1	20.9	19.6	30.0	33.8	28.4	31.9	31.4	
Progression Factor	1.06	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	128.5	4.4		9.3	0.1	0.0	0.3	17.2	1.6	2.4	5.7	
Delay (s)	178.3	38.7		47.5	21.0	19.6	30.3	51.0	30.0	34.3	37.1	
Level of Service	F	D		D	C	B	C	D	C	C	D	
Approach Delay (s)		43.9			37.0			40.1			36.3	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			39.2				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			95.3				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			64.9%				ICU Level of Service				C	
Analysis Period (min)			15									
c	Critical Lane Group											

































HCM Signalized Intersection Capacity Analysis
58: Road "B" North & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3539	1583	1770	3539	1583
Volume (vph)	280	50	50	40	10	10	60	980	260	10	680	200
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	289	52	52	41	10	10	62	1010	268	10	701	206
RTOR Reduction (vph)	0	0	39	0	9	0	0	0	150	0	0	123
Lane Group Flow (vph)	289	52	13	41	11	0	62	1010	118	10	701	83
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	14.8	15.9	15.9	2.1	3.2		2.9	27.3	27.3	0.6	25.0	25.0
Effective Green, g (s)	14.8	15.9	15.9	2.1	3.2		2.9	27.3	27.3	0.6	25.0	25.0
Actuated g/C Ratio	0.24	0.26	0.26	0.03	0.05		0.05	0.44	0.44	0.01	0.40	0.40
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)	423	479	407	60	89		83	1561	698	17	1429	639
v/s Ratio Prot	c0.16	c0.03		0.02	0.01		c0.04	c0.29		0.01	0.20	
v/s Ratio Perm			0.01						0.07			0.05
v/c Ratio	0.68	0.11	0.03	0.68	0.12		0.75	0.65	0.17	0.59	0.49	0.13
Uniform Delay, d1	21.4	17.6	17.2	29.6	28.0		29.1	13.5	10.5	30.5	13.7	11.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.1	0.0	27.6	0.6		30.2	0.9	0.1	42.8	0.3	0.1
Delay (s)	25.9	17.7	17.3	57.1	28.6		59.3	14.5	10.6	73.3	14.0	11.7
Level of Service	C	B	B	E	C		E	B	B	E	B	B
Approach Delay (s)		23.7			47.8			15.8			14.1	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM Average Control Delay			17.1			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			61.9			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			62.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
59: Road "B" South & Road "A"

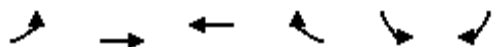
Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	820	200	130	30	60	190	70	530	50	190	410	390
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	845	206	134	31	62	196	72	546	52	196	423	402
RTOR Reduction (vph)	0	0	85	0	0	167	0	0	36	0	0	259
Lane Group Flow (vph)	845	206	49	31	62	29	72	546	16	196	423	143
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	21.1	32.1	32.1	2.2	13.2	13.2	6.7	28.0	28.0	10.1	31.4	31.4
Effective Green, g (s)	21.1	32.1	32.1	2.2	13.2	13.2	6.7	28.0	28.0	10.1	31.4	31.4
Actuated g/C Ratio	0.24	0.36	0.36	0.02	0.15	0.15	0.08	0.32	0.32	0.11	0.36	0.36
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)	819	676	575	44	278	236	134	1121	501	202	1257	562
v/s Ratio Prot	c0.25	c0.11		0.02	0.03		0.04	c0.15		c0.11	c0.12	
v/s Ratio Perm			0.03			0.02			0.01			0.09
v/c Ratio	1.03	0.30	0.08	0.70	0.22	0.12	0.54	0.49	0.03	0.97	0.34	0.25
Uniform Delay, d1	33.7	20.2	18.5	42.8	33.1	32.6	39.4	24.4	20.9	39.0	20.9	20.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.9	0.3	0.1	40.4	0.4	0.2	4.1	1.5	0.1	54.5	0.7	1.1
Delay (s)	73.5	20.4	18.6	83.2	33.5	32.8	43.5	25.9	21.0	93.5	21.6	21.3
Level of Service	E	C	B	F	C	C	D	C	C	F	C	C
Approach Delay (s)		58.1			38.4			27.4			35.3	
Approach LOS		E			D			C			D	

Intersection Summary		
HCM Average Control Delay	42.4	HCM Level of Service D
HCM Volume to Capacity ratio	0.67	
Actuated Cycle Length (s)	88.4	Sum of lost time (s) 16.0
Intersection Capacity Utilization	65.2%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

HCM Unsignalized Intersection Capacity Analysis
60: Road "B" North & Pacific Avenue
























Sutter Pointe EIR
Cumulative Plus Project No PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↶
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	390	190	60	10	30	30
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	402	196	62	10	31	31
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	62				1067	67
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	62				1067	67
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	74				83	97
cM capacity (veh/h)	1541				182	997
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2	
Volume Total	402	196	72	31	31	
Volume Left	402	0	0	31	0	
Volume Right	0	0	10	0	31	
cSH	1541	1700	1700	182	997	
Volume to Capacity	0.26	0.12	0.04	0.17	0.03	
Queue Length 95th (ft)	26	0	0	15	2	
Control Delay (s)	8.2	0.0	0.0	28.8	8.7	
Lane LOS	A			D	A	
Approach Delay (s)	5.5		0.0	18.8		
Approach LOS				C		
Intersection Summary						
Average Delay			6.1			
Intersection Capacity Utilization			38.3%		ICU Level of Service	A
Analysis Period (min)			15			
























HCM Signalized Intersection Capacity Analysis
61: Road "B" North & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1773		1770	3511		1770	3510	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1773		1770	3511		1770	3510	
Volume (vph)	70	90	70	10	20	10	30	360	20	10	350	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	93	72	10	21	10	31	371	21	10	361	21
RTOR Reduction (vph)	0	0	59	0	9	0	0	4	0	0	4	0
Lane Group Flow (vph)	72	93	13	10	22	0	31	388	0	10	378	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	3.7	9.8	9.8	0.6	6.7		0.6	28.8		0.6	28.8	
Effective Green, g (s)	3.7	9.8	9.8	0.6	6.7		0.6	28.8		0.6	28.8	
Actuated g/C Ratio	0.07	0.18	0.18	0.01	0.12		0.01	0.52		0.01	0.52	
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)	117	327	278	19	213		19	1812		19	1812	
v/s Ratio Prot	c0.04	c0.05		0.01	0.01		c0.02	c0.11		0.01	0.11	
v/s Ratio Perm			0.01									
v/c Ratio	0.62	0.28	0.05	0.53	0.10		1.63	0.21		0.53	0.21	
Uniform Delay, d1	25.4	20.0	19.1	27.5	21.9		27.6	7.3		27.5	7.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.3	0.5	0.1	23.9	0.2		441.7	0.1		23.9	0.1	
Delay (s)	34.6	20.4	19.2	51.3	22.1		469.3	7.4		51.3	7.4	
Level of Service	C	C	B	D	C		F	A		D	A	
Approach Delay (s)		24.4			29.2			41.3			8.5	
Approach LOS		C			C			D			A	
Intersection Summary												
HCM Average Control Delay			25.4				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			55.8				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			34.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
62: Road "B" South & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1842		1770	1863	1583	1770	3274		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1842		1770	1863	1583	1770	3274		1770	3539	1583
Volume (vph)	250	120	10	10	40	150	10	10	10	210	10	220
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	258	124	10	10	41	155	10	10	10	216	10	227
RTOR Reduction (vph)	0	4	0	0	0	130	0	8	0	0	0	144
Lane Group Flow (vph)	258	130	0	10	41	25	10	12	0	216	10	83
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	12.4	21.9		0.6	10.1	10.1	0.6	12.7		10.4	22.5	22.5
Effective Green, g (s)	12.4	21.9		0.6	10.1	10.1	0.6	12.7		10.4	22.5	22.5
Actuated g/C Ratio	0.20	0.36		0.01	0.16	0.16	0.01	0.21		0.17	0.37	0.37
Clearance Time (s)	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
Lane Grp Cap (vph)	356	655		17	305	260	17	675		299	1293	578
v/s Ratio Prot	c0.15	c0.07		0.01	0.02		0.01	0.00		c0.12	0.00	
v/s Ratio Perm						0.02						c0.05
v/c Ratio	0.72	0.20		0.59	0.13	0.10	0.59	0.02		0.72	0.01	0.14
Uniform Delay, d1	23.0	13.8		30.4	22.0	21.9	30.4	19.5		24.2	12.4	13.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.1	0.1		42.8	0.2	0.2	42.8	0.0		8.3	0.0	0.1
Delay (s)	30.2	13.9		73.1	22.2	22.0	73.1	19.5		32.6	12.4	13.2
Level of Service	C	B		E	C	C	E	B		C	B	B
Approach Delay (s)		24.6			24.6			37.4			22.4	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM Average Control Delay			24.0									HCM Level of Service C
HCM Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			61.6									Sum of lost time (s) 8.0
Intersection Capacity Utilization			45.5%									ICU Level of Service A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 63: Road "B" North & Road "D"













Sutter Pointe EIR
 Cumulative Plus Project No PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	20	60	40	340	440	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	62	41	351	454	10
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	41				144	41
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	41				144	41
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				46	99
cM capacity (veh/h)	1568				837	1030
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	21	62	41	351	454	10
Volume Left	21	0	0	0	454	0
Volume Right	0	0	0	351	0	10
cSH	1568	1700	1700	1700	837	1030
Volume to Capacity	0.01	0.04	0.02	0.21	0.54	0.01
Queue Length 95th (ft)	1	0	0	0	83	1
Control Delay (s)	7.3	0.0	0.0	0.0	14.3	8.5
Lane LOS	A				B	A
Approach Delay (s)	1.8		0.0		14.1	
Approach LOS					B	
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			38.8%		ICU Level of Service	A
Analysis Period (min)			15			













HCM Signalized Intersection Capacity Analysis
64: Elverta Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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
Lane Util. Factor		0.95	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)		3539	1583		1863	1583				1770	1583	1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)		3539	1583		1863	1583				1770	1583	1583
Volume (vph)	0	700	330	0	370	360	0	0	0	550	0	70
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	722	340	0	381	371	0	0	0	567	0	72
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	44
Lane Group Flow (vph)	0	722	340	0	381	371	0	0	0	567	0	28
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					8		
Permitted Phases			Free			Free						8
Actuated Green, G (s)		23.2	51.1		23.2	51.1				19.9		19.9
Effective Green, g (s)		23.2	51.1		23.2	51.1				19.9		19.9
Actuated g/C Ratio		0.45	1.00		0.45	1.00				0.39		0.39
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		1607	1583		846	1583				689		616
v/s Ratio Prot		0.20			c0.20					c0.32		
v/s Ratio Perm			0.21			0.23						0.02
v/c Ratio		0.45	0.21		0.45	0.23				0.82		0.05
Uniform Delay, d1		9.6	0.0		9.6	0.0				14.0		9.7
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.2	0.3		1.7	0.3				7.9		0.0
Delay (s)		9.8	0.3		11.3	0.3				21.9		9.7
Level of Service		A	A		B	A				C		A
Approach Delay (s)		6.7			5.9			0.0			20.5	
Approach LOS		A			A			A			C	
Intersection Summary												
HCM Average Control Delay			10.1				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			51.1				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			56.6%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
65: Elverta Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	1.00		0.95	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		3539	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		3539	1583	1770		1583			
Volume (vph)	0	980	270	0	550	220	180	0	660	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1010	278	0	567	227	186	0	680	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1010	278	0	567	227	186	0	680	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		46.4	66.8		46.4	66.8	12.4		66.8			
Effective Green, g (s)		46.4	66.8		46.4	66.8	12.4		66.8			
Actuated g/C Ratio		0.69	1.00		0.69	1.00	0.19		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1294	1583		2458	1583	329		1583			
v/s Ratio Prot		c0.54			0.16		0.11					
v/s Ratio Perm			0.18			0.14			c0.43			
v/c Ratio		0.78	0.18		0.23	0.14	0.57		0.43			
Uniform Delay, d1		6.8	0.0		3.7	0.0	24.7		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		4.7	0.2		0.0	0.2	2.2		0.9			
Delay (s)		11.5	0.2		3.8	0.2	27.0		0.9			
Level of Service		B	A		A	A	C		A			
Approach Delay (s)		9.1			2.7			6.5			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			6.6				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			66.8				Sum of lost time (s)		4.0			
Intersection Capacity Utilization			68.2%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

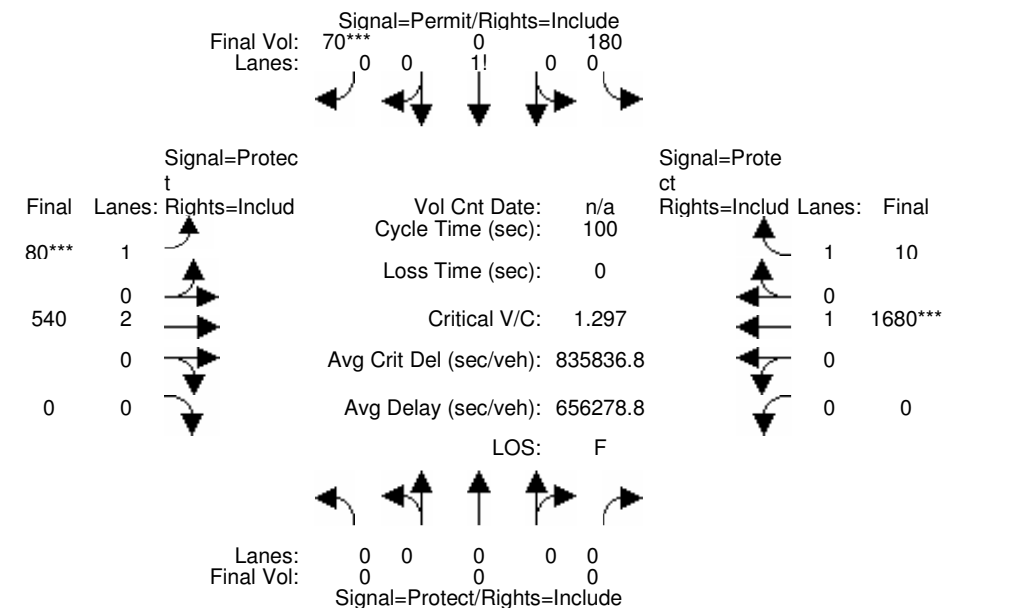
HCM Signalized Intersection Capacity Analysis
66: Sankey Rd & Road "C"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

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	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	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	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	120	70	140	50	20	50	150	690	430	290	660	260
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	124	72	144	52	21	52	155	711	443	299	680	268
RTOR Reduction (vph)	0	0	120	0	0	48	0	0	231	0	0	144
Lane Group Flow (vph)	124	72	24	52	21	4	155	711	212	299	680	124
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.8	12.6	12.6	2.1	5.9	5.9	13.6	30.1	30.1	14.6	31.1	31.1
Effective Green, g (s)	8.8	12.6	12.6	2.1	5.9	5.9	13.6	30.1	30.1	14.6	31.1	31.1
Actuated g/C Ratio	0.12	0.17	0.17	0.03	0.08	0.08	0.18	0.40	0.40	0.19	0.41	0.41
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)	207	591	265	96	277	124	319	1413	632	343	1460	653
v/s Ratio Prot	c0.07	c0.02		0.02	0.01		0.09	c0.20		c0.17	0.19	
v/s Ratio Perm			0.02			0.00			0.13			0.08
v/c Ratio	0.60	0.12	0.09	0.54	0.08	0.03	0.49	0.50	0.34	0.87	0.47	0.19
Uniform Delay, d1	31.6	26.7	26.6	36.2	32.2	32.1	27.8	17.0	15.7	29.5	16.1	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1	0.1	6.1	0.1	0.1	1.2	1.3	1.4	20.8	1.1	0.6
Delay (s)	36.2	26.8	26.7	42.3	32.3	32.2	28.9	18.3	17.1	50.3	17.2	14.8
Level of Service	D	C	C	D	C	C	C	B	B	D	B	B
Approach Delay (s)		30.2			36.4			19.2			24.6	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM Average Control Delay			23.4				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			75.4				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			58.5%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

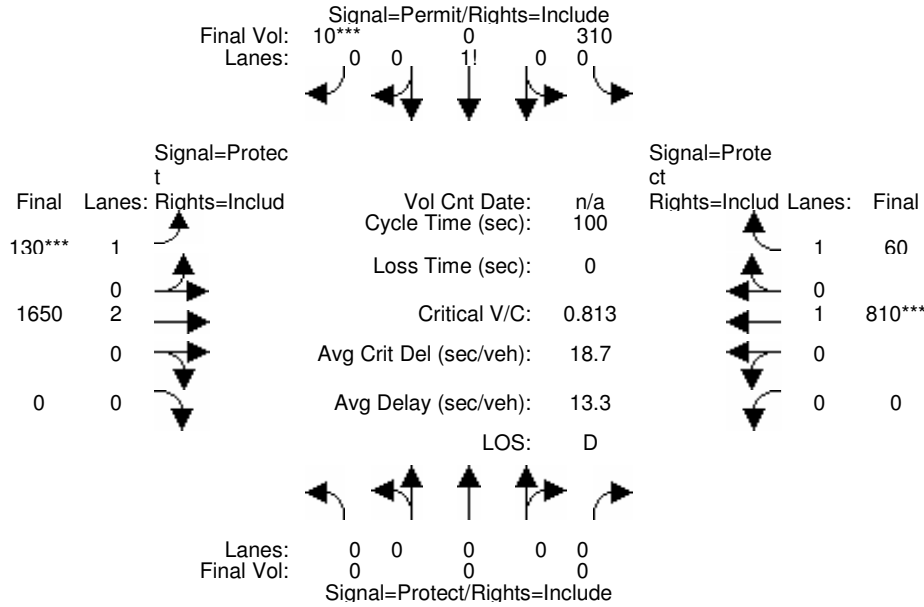
Intersection #17: Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	180	0	70	80	540	0	0	1680	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	180	0	70	80	540	0	0	1680	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	180	0	70	80	540	0	0	1680	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	180	0	70	80	540	0	0	1680	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	180	0	70	80	540	0	0	1680	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	180	0	70	80	540	0	0	1680	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.72	0.00	0.28	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1116	0	434	1550	3100	0	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.16	0.00	0.16	0.05	0.17	0.00	0.00	1.08	0.01
Crit Volume:	0					250	80				1680	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PM

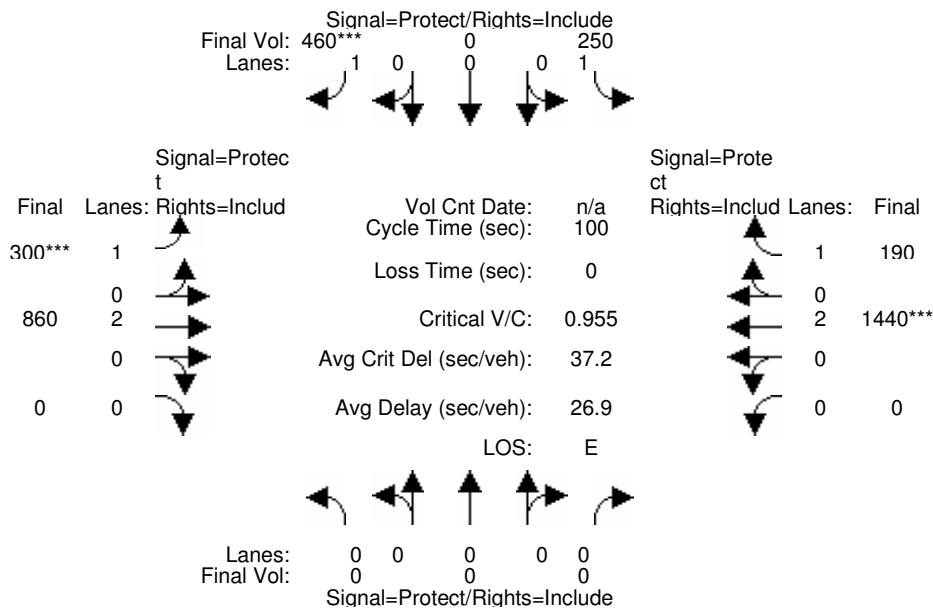
Intersection #17: Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	310	0	10	130	1650	0	0	810	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	310	0	10	130	1650	0	0	810	60
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	310	0	10	130	1650	0	0	810	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	310	0	10	130	1650	0	0	810	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	310	0	10	130	1650	0	0	810	60
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	310	0	10	130	1650	0	0	810	60
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.97	0.00	0.03	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1502	0	48	1550	3100	0	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.21	0.00	0.21	0.08	0.53	0.00	0.00	0.52	0.04
Crit Volume:	0					320	130			810		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

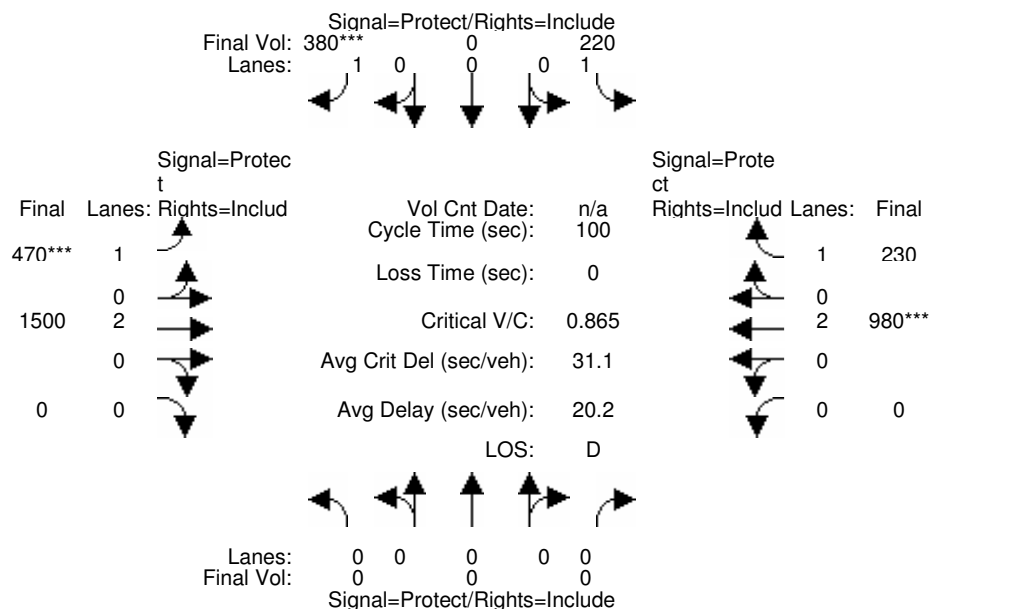
Intersection #18: Elverta Road / Palladay Road



Street Name:	Palladay Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	250	0	460	300	860	0	0	1440	190
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	250	0	460	300	860	0	0	1440	190
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	250	0	460	300	860	0	0	1440	190
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	250	0	460	300	860	0	0	1440	190
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	250	0	460	300	860	0	0	1440	190
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	250	0	460	300	860	0	0	1440	190
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.16	0.00	0.30	0.19	0.28	0.00	0.00	0.46	0.12
Crit Volume:	0					460	300				720	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PM

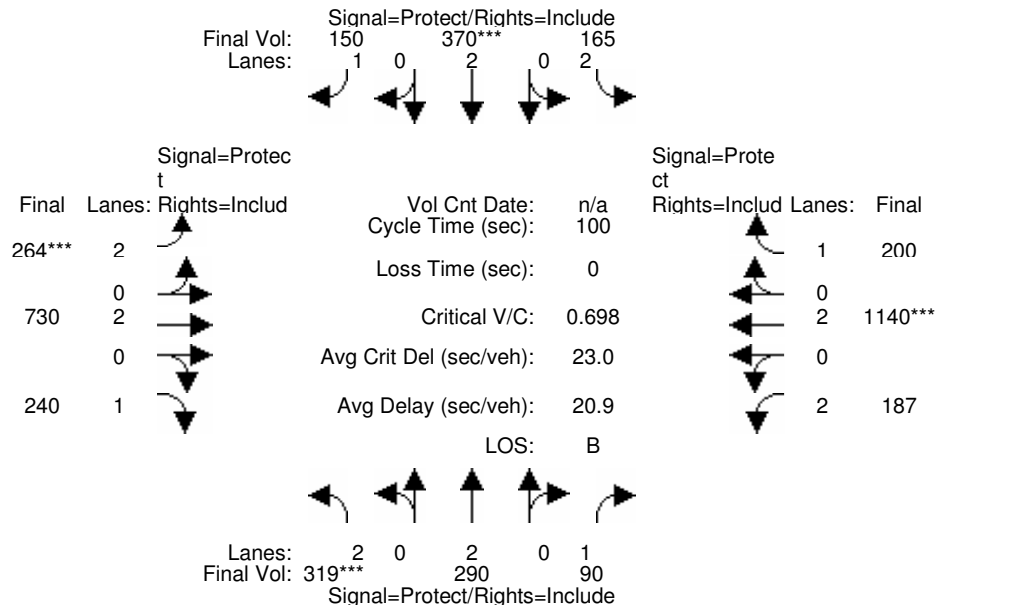
Intersection #18: Elverta Road / Palladay Road



Street Name:	Palladay Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	220	0	380	470	1500	0	0	980	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	220	0	380	470	1500	0	0	980	230
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	220	0	380	470	1500	0	0	980	230
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	220	0	380	470	1500	0	0	980	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	220	0	380	470	1500	0	0	980	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	220	0	380	470	1500	0	0	980	230
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.14	0.00	0.25	0.30	0.48	0.00	0.00	0.32	0.15
Crit Volume:	0					380	470				490	
Crit Moves:						****	****				****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

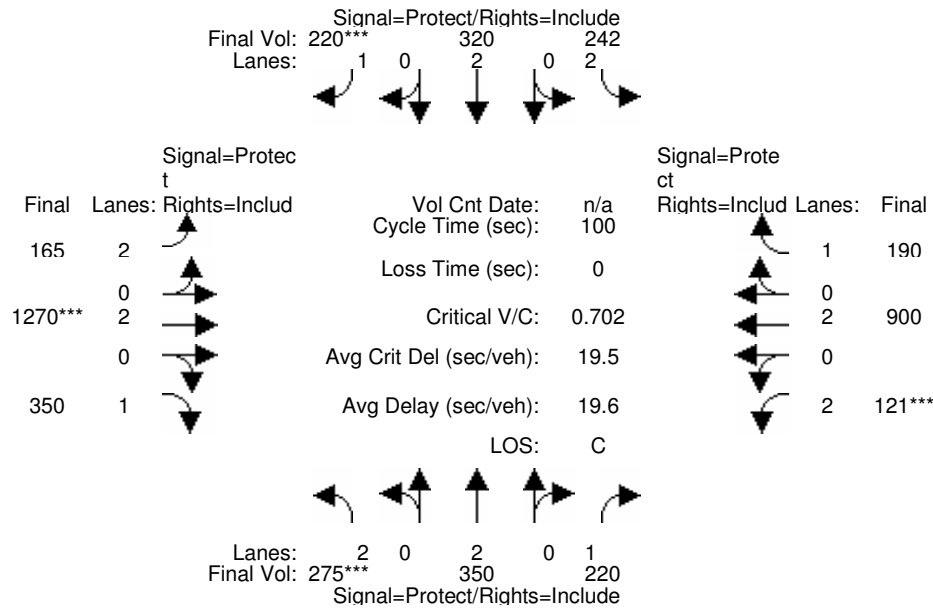
Intersection #19: Elverta Road / 16th Street



Street Name:	16th Street						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	290	290	90	150	370	150	240	730	240	170	1140	200
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	290	290	90	150	370	150	240	730	240	170	1140	200
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	290	290	90	150	370	150	240	730	240	170	1140	200
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	290	290	90	150	370	150	240	730	240	170	1140	200
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	290	290	90	150	370	150	240	730	240	170	1140	200
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	319	290	90	165	370	150	264	730	240	187	1140	200
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	3000	1500	3000	3000	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.11	0.10	0.06	0.06	0.12	0.10	0.09	0.24	0.16	0.06	0.38	0.13
Crit Volume:	160			185			132			570		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PM

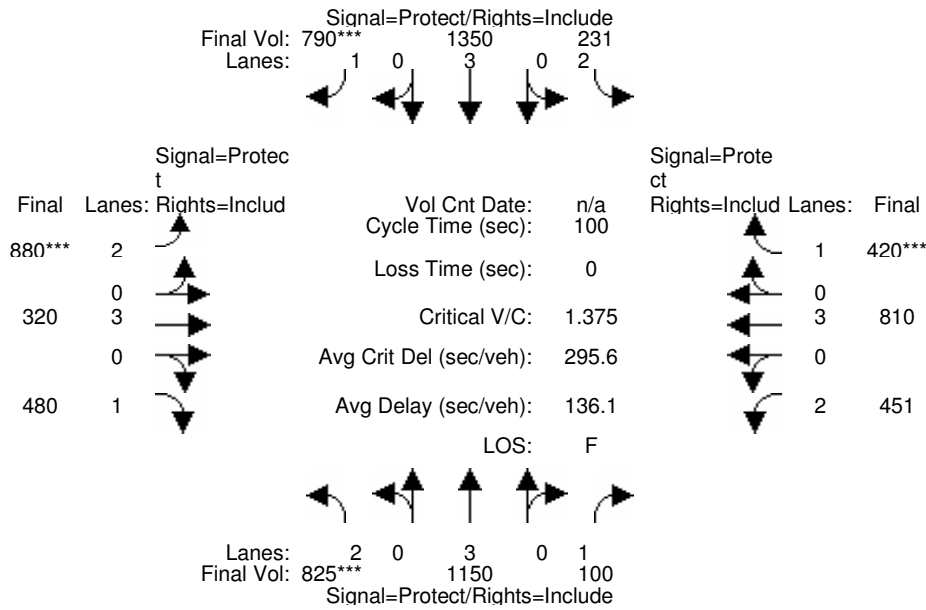
Intersection #19: Elverta Road / 16th Street



Street Name:	16th Street						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	250	350	220	220	320	220	150	1270	350	110	900	190
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	250	350	220	220	320	220	150	1270	350	110	900	190
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	250	350	220	220	320	220	150	1270	350	110	900	190
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	250	350	220	220	320	220	150	1270	350	110	900	190
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	250	350	220	220	320	220	150	1270	350	110	900	190
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	275	350	220	242	320	220	165	1270	350	121	900	190
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	3000	1500	3000	3000	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.09	0.12	0.15	0.08	0.11	0.15	0.06	0.42	0.23	0.04	0.30	0.13
Crit Volume:	138					220	635			61		
Crit Moves:	****					****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

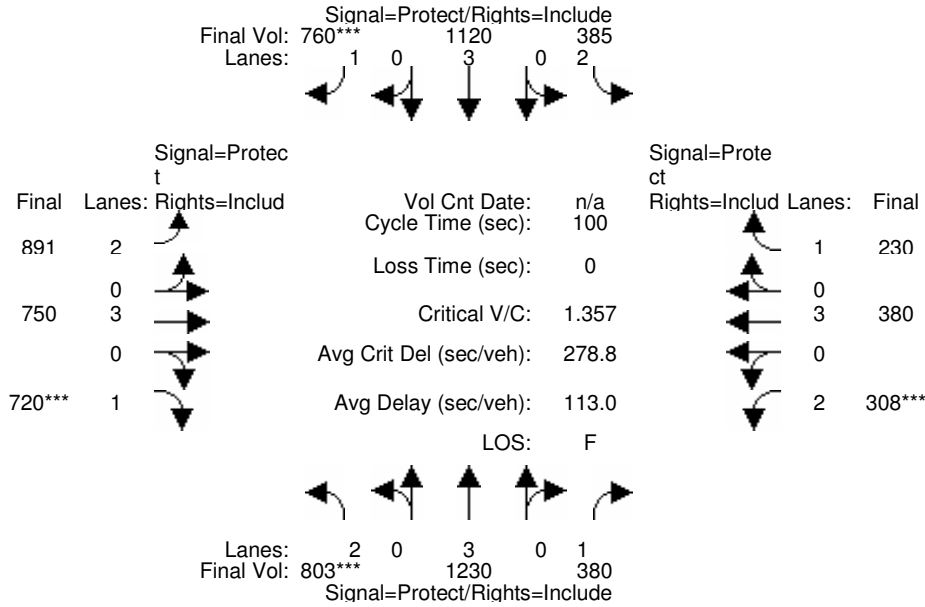
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	750	1150	100	210	1350	790	800	320	480	410	810	420
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	750	1150	100	210	1350	790	800	320	480	410	810	420
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	750	1150	100	210	1350	790	800	320	480	410	810	420
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	750	1150	100	210	1350	790	800	320	480	410	810	420
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	750	1150	100	210	1350	790	800	320	480	410	810	420
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	825	1150	100	231	1350	790	880	320	480	451	810	420
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.28	0.26	0.07	0.08	0.30	0.53	0.29	0.07	0.32	0.15	0.18	0.28
Crit Volume:	413					790	440					420
Crit Moves:	****					****	****					****

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PM

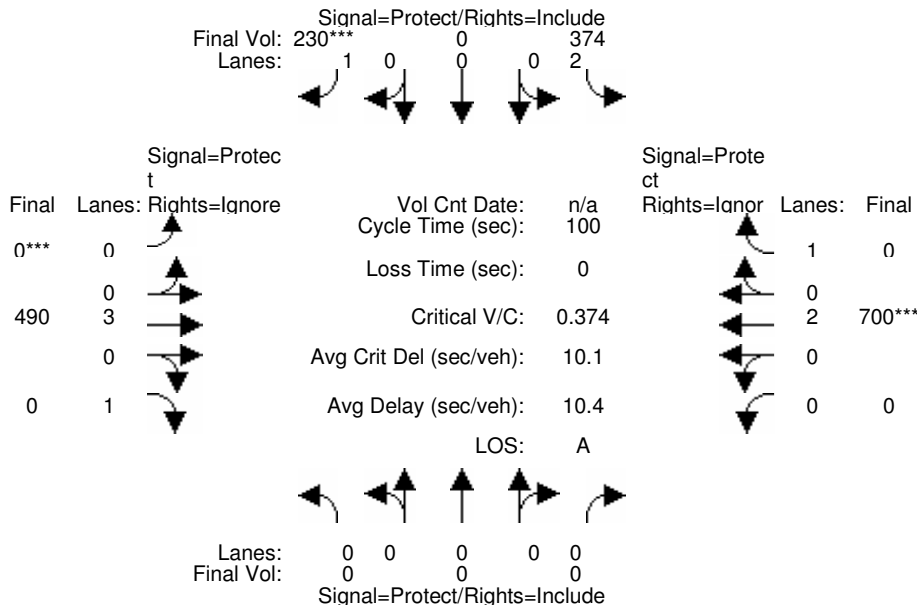
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	730	1230	380	350	1120	760	810	750	720	280	380	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	730	1230	380	350	1120	760	810	750	720	280	380	230
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	730	1230	380	350	1120	760	810	750	720	280	380	230
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	730	1230	380	350	1120	760	810	750	720	280	380	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	730	1230	380	350	1120	760	810	750	720	280	380	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	803	1230	380	385	1120	760	891	750	720	308	380	230
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.27	0.27	0.25	0.13	0.25	0.51	0.30	0.17	0.48	0.10	0.08	0.15
Crit Volume:	402					760			720	154		
Crit Moves:	****					****			****	****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

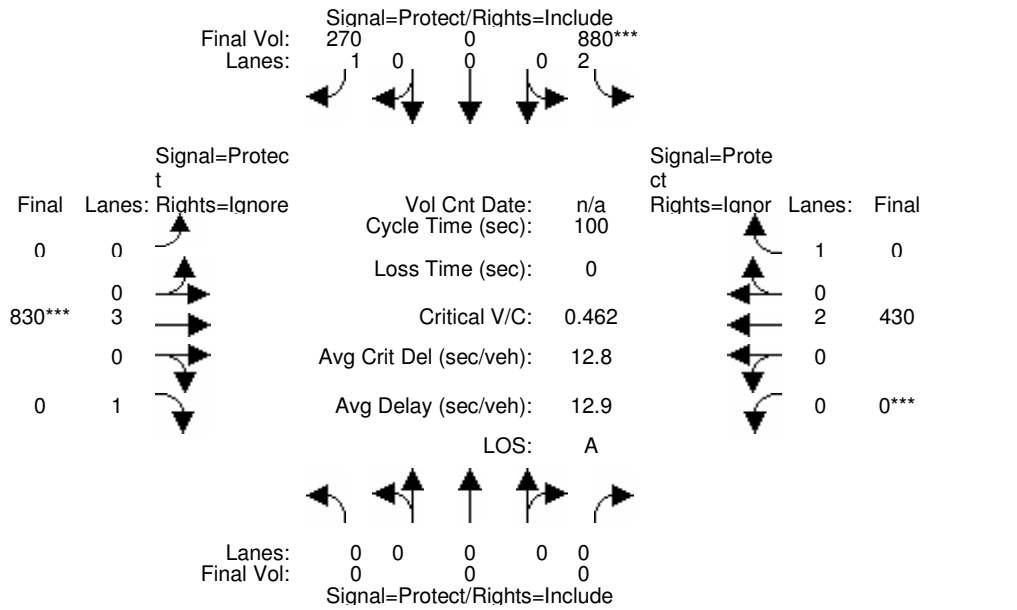
Intersection #21: Elkhorn Boulevard / SR 70 / SR99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	340	0	230	0	490	170	0	700	980
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	340	0	230	0	490	170	0	700	980
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	340	0	230	0	490	170	0	700	980
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	340	0	230	0	490	0	0	700	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	340	0	230	0	490	0	0	700	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	374	0	230	0	490	0	0	700	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	0	3100	0	1550	0	4650	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.12	0.00	0.15	0.00	0.11	0.00	0.00	0.23	0.00
Crit Volume:	0					230	0			350		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PM

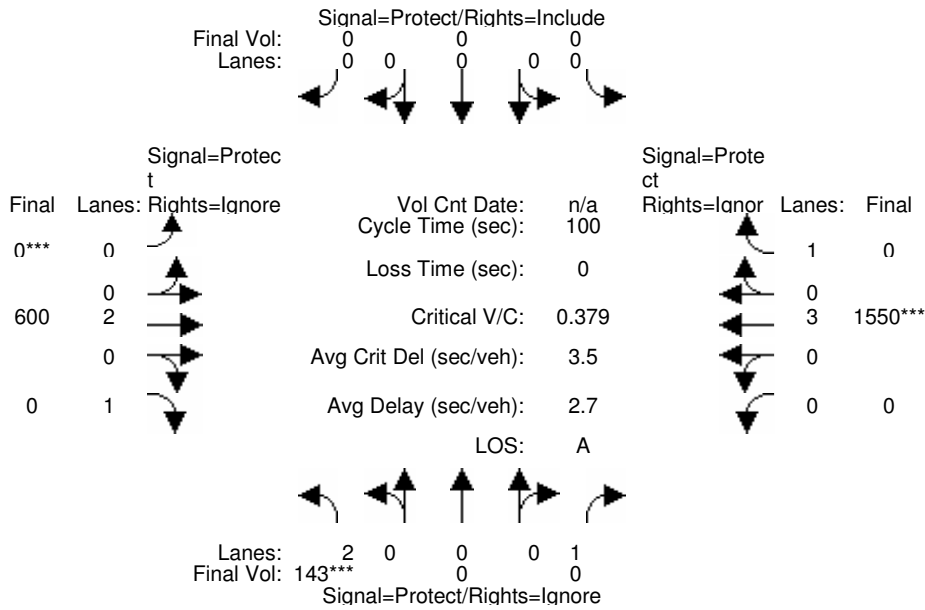
Intersection #21: Elkhorn Boulevard / SR 70 / SR99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	800	0	270	0	830	110	0	430	370
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	800	0	270	0	830	110	0	430	370
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	800	0	270	0	830	110	0	430	370
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	800	0	270	0	830	0	0	430	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	800	0	270	0	830	0	0	430	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	880	0	270	0	830	0	0	430	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	0	3100	0	1550	0	4650	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.28	0.00	0.17	0.00	0.18	0.00	0.00	0.14	0.00
Crit Volume:	0			440			277			0		
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project AM

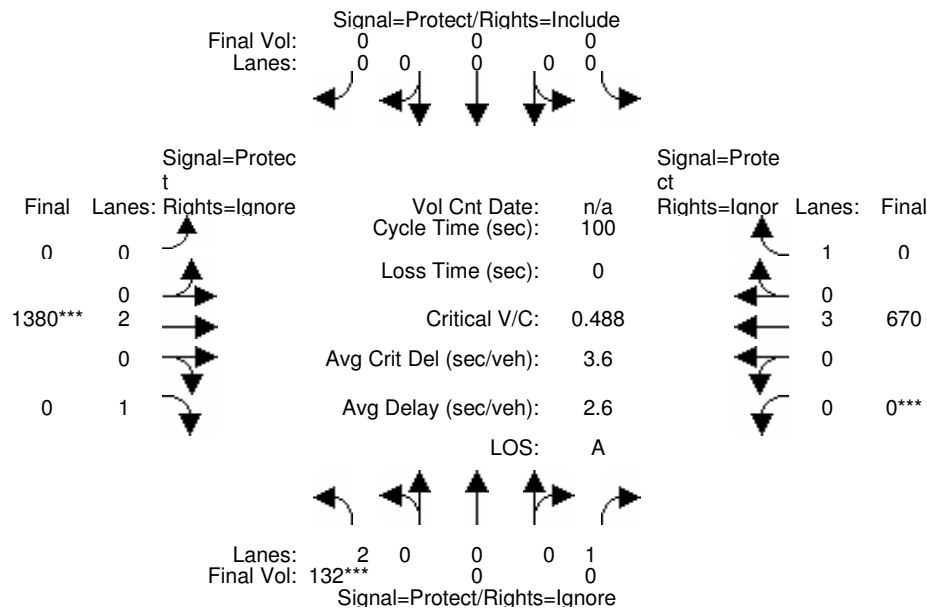
Intersection #22: Elkhorn Boulevard / SR 70 / SR 99 NB Ramps



Street Name:	SR 70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	130	0	450	0	0	0	0	600	230	0	1550	720
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	130	0	450	0	0	0	0	600	230	0	1550	720
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	130	0	450	0	0	0	0	600	230	0	1550	720
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	130	0	0	0	0	0	0	600	0	0	1550	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	130	0	0	0	0	0	0	600	0	0	1550	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.10	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	143	0	0	0	0	0	0	600	0	0	1550	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	3.00	1.00
Final Sat.:	3100	0	1550	0	0	0	0	3100	1550	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.33	0.00
Crit Volume:	72										517	
Crit Moves:	****							****			****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PM

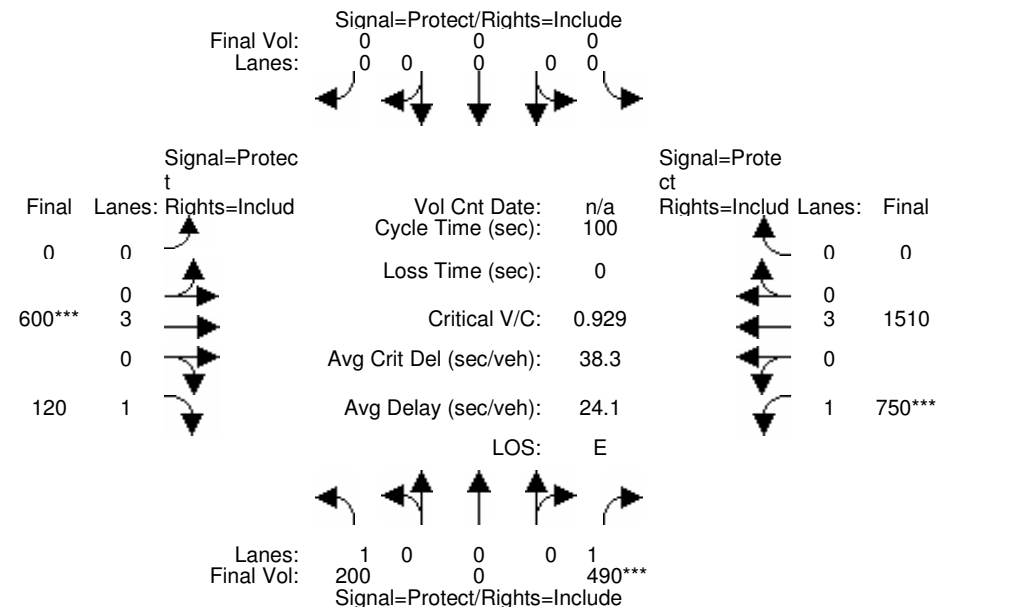
Intersection #22: Elkhorn Boulevard / SR 70 / SR 99 NB Ramps



Street Name:	SR 70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	120	0	1460	0	0	0	0	1380	250	0	670	480
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	120	0	1460	0	0	0	0	1380	250	0	670	480
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	120	0	1460	0	0	0	0	1380	250	0	670	480
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	120	0	0	0	0	0	0	1380	0	0	670	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	120	0	0	0	0	0	0	1380	0	0	670	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.10	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	132	0	0	0	0	0	0	1380	0	0	670	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	3.00	1.00
Final Sat.:	3100	0	1550	0	0	0	0	3100	1550	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	0.14	0.00
Crit Volume:	66							690				
Crit Moves:	****							****			****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

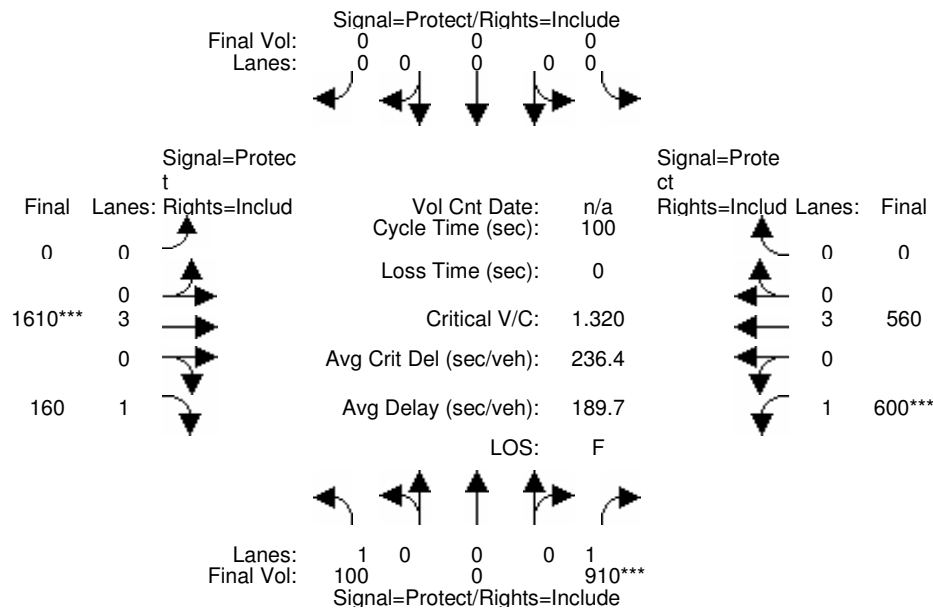
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	200	0	490	0	0	0	0	600	120	750	1510	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	200	0	490	0	0	0	0	600	120	750	1510	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	200	0	490	0	0	0	0	600	120	750	1510	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	200	0	490	0	0	0	0	600	120	750	1510	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	200	0	490	0	0	0	0	600	120	750	1510	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	200	0	490	0	0	0	0	600	120	750	1510	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	1550	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.13	0.00	0.32	0.00	0.00	0.00	0.00	0.13	0.08	0.48	0.32	0.00
Crit Volume:			490	0			200			750		
Crit Moves:			***				***			***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PM

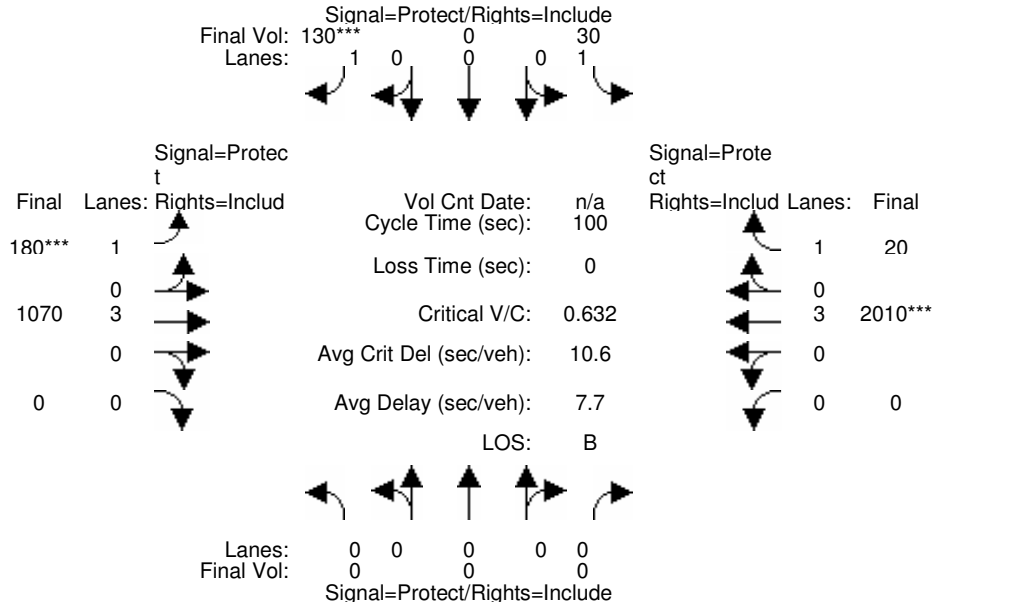
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	100	0	910	0	0	0	0	1610	160	600	560	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	100	0	910	0	0	0	0	1610	160	600	560	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	100	0	910	0	0	0	0	1610	160	600	560	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	100	0	910	0	0	0	0	1610	160	600	560	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	100	0	910	0	0	0	0	1610	160	600	560	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	100	0	910	0	0	0	0	1610	160	600	560	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	1550	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.59	0.00	0.00	0.00	0.00	0.35	0.10	0.39	0.12	0.00
Crit Volume:			910	0				537		600		
Crit Moves:			***					***		***		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project AM

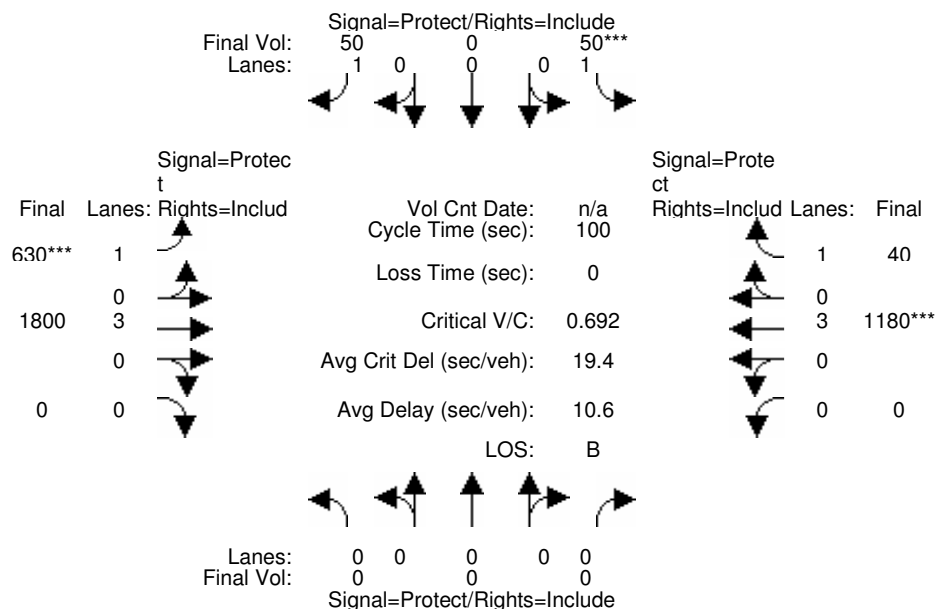
Intersection #24: Elk Horn Boulevard / East Levee Road



Street Name:	East Levee Road						Elk Horn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	30	0	130	180	1070	0	0	2010	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	30	0	130	180	1070	0	0	2010	20
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	30	0	130	180	1070	0	0	2010	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	30	0	130	180	1070	0	0	2010	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	30	0	130	180	1070	0	0	2010	20
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	30	0	130	180	1070	0	0	2010	20
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	4650	0	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.08	0.12	0.23	0.00	0.00	0.43	0.01
Crit Volume:	0					130	180				670	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PM

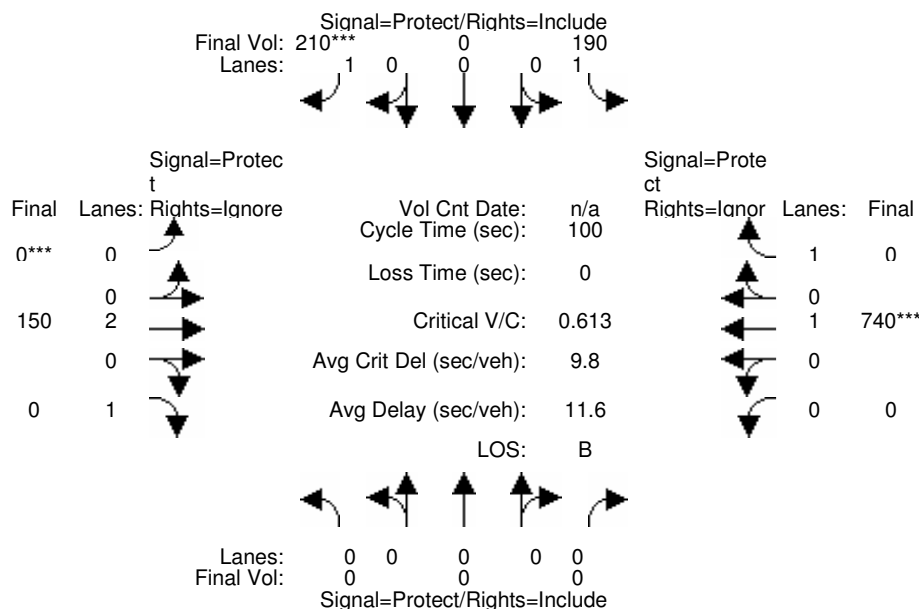
Intersection #24: Elk Horn Boulevard / East Levee Road



Street Name:	East Levee Road						Elk Horn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	50	0	50	630	1800	0	0	1180	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	50	0	50	630	1800	0	0	1180	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	50	0	50	630	1800	0	0	1180	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	50	0	50	630	1800	0	0	1180	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	50	0	50	630	1800	0	0	1180	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	50	0	50	630	1800	0	0	1180	40
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	4650	0	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.03	0.00	0.03	0.41	0.39	0.00	0.00	0.25	0.03
Crit Volume:	0			50			630			393		
Crit Moves:				***			***			***		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project AM

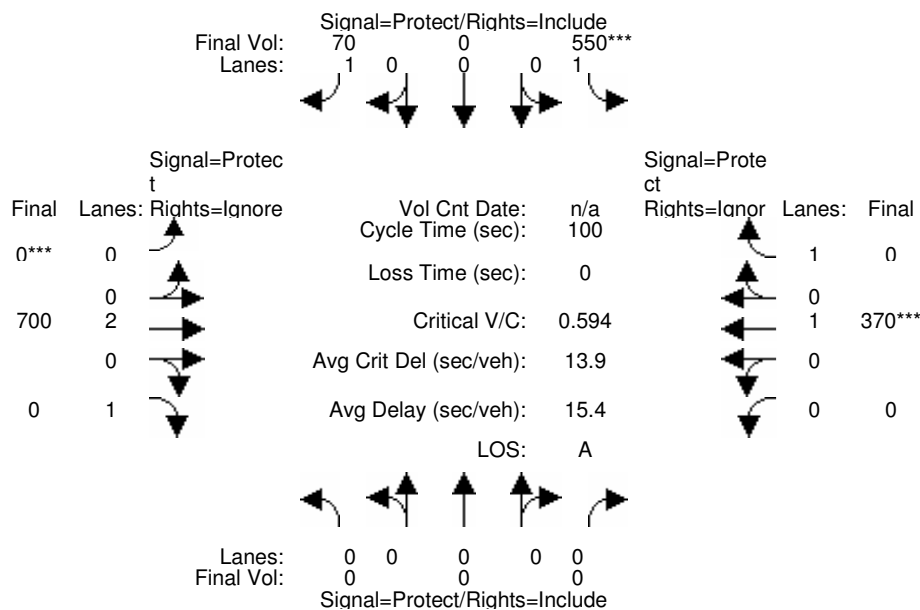
Intersection #64:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	190	0	210	0	150	110	0	740	610
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	190	0	210	0	150	110	0	740	610
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	190	0	210	0	150	110	0	740	610
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	190	0	210	0	150	0	0	740	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	190	0	210	0	150	0	0	740	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	190	0	210	0	150	0	0	740	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	3100	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.12	0.00	0.14	0.00	0.05	0.00	0.00	0.48	0.00
Crit Volume:	0					210	0			740		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PM

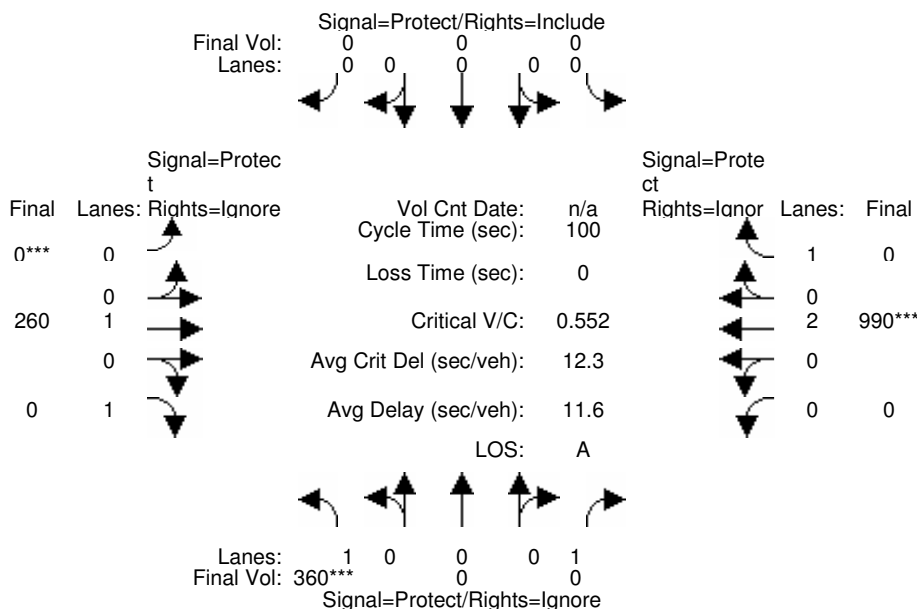
Intersection #64:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	550	0	70	0	700	330	0	370	360
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	550	0	70	0	700	330	0	370	360
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	550	0	70	0	700	330	0	370	360
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	550	0	70	0	700	0	0	370	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	550	0	70	0	700	0	0	370	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	550	0	70	0	700	0	0	370	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	3100	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.35	0.00	0.05	0.00	0.23	0.00	0.00	0.24	0.00
Crit Volume:	0			550			0			370		
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project AM

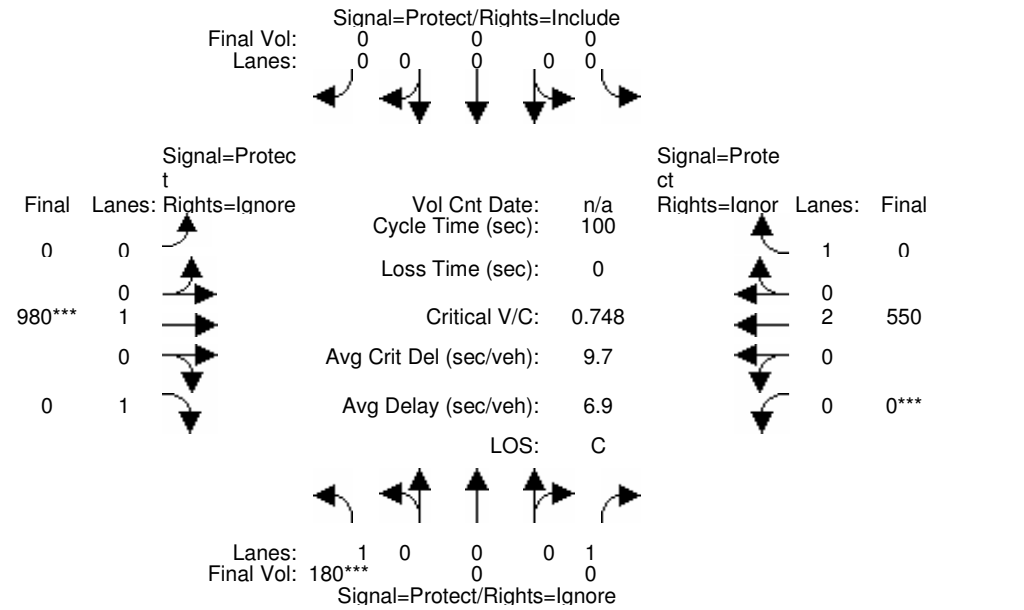
Intersection #65:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	360	0	210	0	0	0	0	260	80	0	990	330
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	360	0	210	0	0	0	0	260	80	0	990	330
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	360	0	210	0	0	0	0	260	80	0	990	330
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	360	0	0	0	0	0	0	260	0	0	990	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	360	0	0	0	0	0	0	260	0	0	990	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	360	0	0	0	0	0	0	260	0	0	990	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.32	0.00
Crit Volume:	360							0			495	
Crit Moves:	****							****			****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PM

Intersection #65:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	180	0	660	0	0	0	0	980	270	0	550	220
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	180	0	660	0	0	0	0	980	270	0	550	220
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	180	0	660	0	0	0	0	980	270	0	550	220
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	180	0	0	0	0	0	0	980	0	0	550	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	180	0	0	0	0	0	0	980	0	0	550	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	180	0	0	0	0	0	0	980	0	0	550	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.18	0.00
Crit Volume:	180							980			0	
Crit Moves:	****							****			****	

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 6890 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 700 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	6890	700	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1872	190	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8425	780	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 4913$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	9205	7050	Yes
$v v$	3512 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		Yes	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 5725		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	5725	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 54.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.910
S
Space mean speed in ramp influence area, S = -1.9 mph
R
Space mean speed in outer lanes, S = 56.1 mph
O
Space mean speed for all vehicles, S = mph

Average passenger-car speed, S 56.0 mi/h
 Number of lanes, N 2
 Density, D 39.9 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3655 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 993 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2235 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2235 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 60.5 mi/h
 Number of lanes, N 2
 Density, D 34.0 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3635 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 988 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2055 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2055 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7630 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	7630	1170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	2073	318	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8625	1304	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 4496$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	8625	9400	No
Fi F			
v = v - v	7321	9400	No
FO F R			
v	1304	2100	No
R			
v v	2064 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4496	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 38.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.415$
S
Space mean speed in ramp influence area, $S = 55.4$ mph
R
Space mean speed in outer lanes, $S = 67.2$ mph
0
Space mean speed for all vehicles, $S = 60.5$ mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4820 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4820	580	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1310	158	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5894		646		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5894$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5894	4700	Yes
Fi F			
$v = v - v$	5248	4700	Yes
FO F R			
v	646	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5894	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 52.2$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.356$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4240 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	25.0 mph
Volume on ramp	230 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4240	230	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1152	62	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5185	256	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5185 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5441	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5185	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 44.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.196
S
Space mean speed in ramp influence area, S = 37.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 37.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4470 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	720 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4470	720	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1215	196	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5466	802	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5466 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6268	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5466	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 50.9 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.333
S
Space mean speed in ramp influence area, S = 11.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 11.3 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5190 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5190	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1410	155	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6346	635	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6346$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	6346	4700	Yes
Fi F			
v = v - v	5711	4700	Yes
FO F R			
v	635	2100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	6346	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 56.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4620 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	25.0 mph
Volume on ramp	80 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	4620	80	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1255	22	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5649	89	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5649 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5738	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5649	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 47.1 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.507
S
Space mean speed in ramp influence area, S = 30.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 30.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4700 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4700	330	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1277	90	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5747	368	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5747$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6115	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5747	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 49.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.041
S
Space mean speed in ramp influence area, S = 18.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 18.1 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 19.6 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2080 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 565 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1272 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1272 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 372 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 838 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 838 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.8 mi/h
 Number of lanes, N 2
 Density, D 25.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2880 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 783 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1628 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1628 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 63.3 mi/h
 Number of lanes, N 2
 Density, D 29.5 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3300 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 897 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1865 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1865 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4260 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 400 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4260	400	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1158	109	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4816	446	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4816$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4816	4700	Yes
Fi F			
v = v - v	4370	4700	No
FO F R			
v	446	2100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4816	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 43.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.338$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3860 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 610 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3860	610	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1049	166	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4363	680	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4363 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5043 4700 Yes
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4363	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 41.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.900
S
Space mean speed in ramp influence area, S = 44.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 44.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4470 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 110 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4470	110	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1215	30	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5053	123	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5053 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5176 4700 Yes
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5053	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 42.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.966
S
Space mean speed in ramp influence area, S = 42.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 42.8 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4580 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4580	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1245	155	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5177	635	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5177$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5177	4700	Yes
Fi F			
$v = v - v$	4542	4700	No
FO F R			
v	635	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5177	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 30.8$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4010 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 980 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4010	980	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1090	266	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4533	1092	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4533 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5625	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4533	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 45.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.377
S
Space mean speed in ramp influence area, S = 33.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 33.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4990 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4990	170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1356	46	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5641	189	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5641 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5830	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5641	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 47.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.603
S
Space mean speed in ramp influence area, S = 28.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 28.1 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5160 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1165 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5160	1165	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1402	317	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 5833 1298 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5833$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5833	4700	Yes
Fi F			
$v = v - v$	4535	4700	No
FO F R			
v	1298	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5833	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 40.9$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.155$
S
Space mean speed in ramp influence area, $S = 61.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3655 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1165 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3655	1165	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	993	317	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4132	1298	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4132 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5430	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4132	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.016
S
Space mean speed in ramp influence area, S = 41.6 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 41.6 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4520 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 885 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4520	885	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1228	240	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 5110 986 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5110$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5110	4700	Yes
Fi F			
$v = v - v$	4124	4700	No
FO F R			
v	986	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5110	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 34.7$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.127$
S
Space mean speed in ramp influence area, $S = 62.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3935 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 885 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3935	885	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1069	240	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4812	986	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4812$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5798	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4812	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 40.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.412
S
Space mean speed in ramp influence area, S = 32.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 32.5 mph

Leisch Method for Weaving Analysis

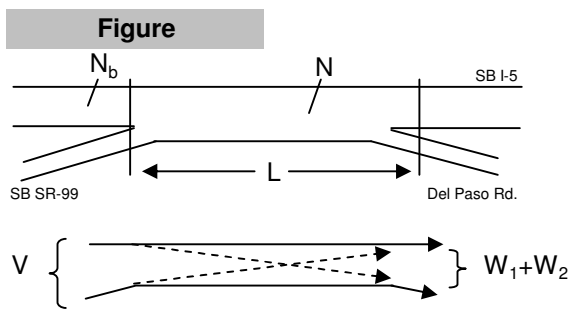
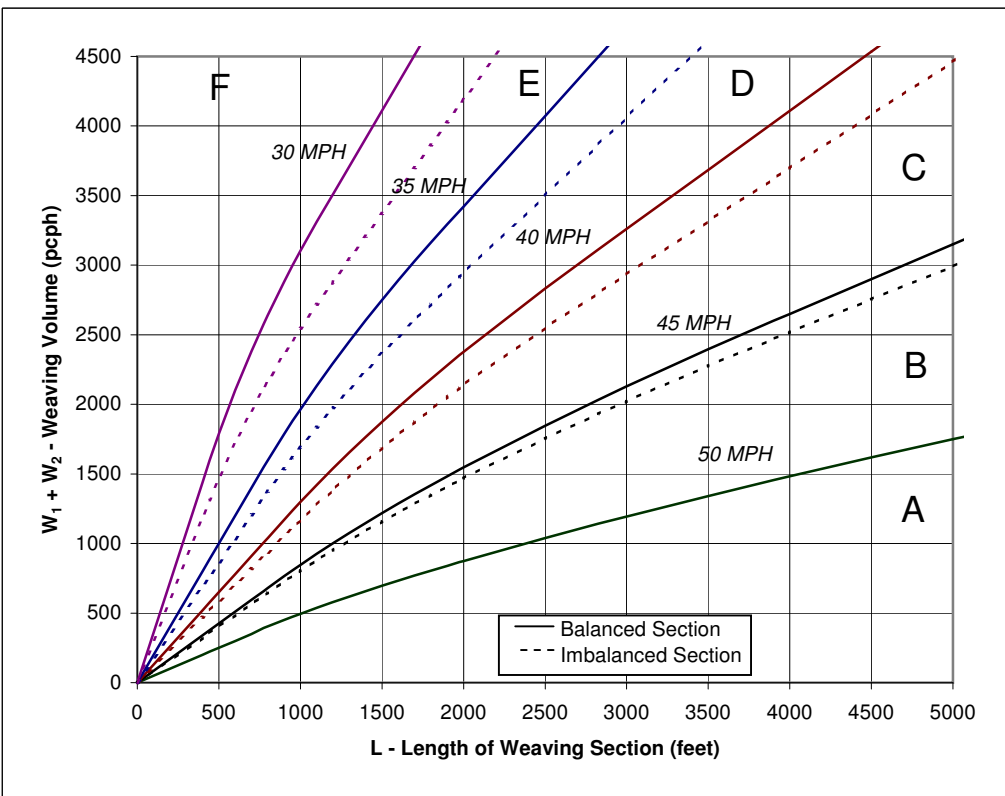
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

Project Information

Project	South Sutter County
Scenario	Cumulative PP NPP - AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	7,630	3,995	1,170
Truck Percentage	8%	5%	5%
PCE for Trucks	1.5	1.5	1.5
Volume (pcph)	7,935	4,095	1,199



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **17.3**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,583**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	7590	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	7590	3935
Lanes	3	2
Capacity Check	LOS F	OK

f_{HV}	0.8889
----------	--------

v_i	9281.25	pc/hr/ln
-------	---------	----------

Density, D	33.7	pc/mi/ln
-------------------	------	----------

LOS	LOS F
------------	-------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP NPP AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 8080 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 800 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	8080	800	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	2082	206	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8663	845	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
v = v (P) = 5051 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	9508	7050	Yes
v v	3612 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		Yes	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v = 5963		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	5963	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 56.9 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 3.833
S
Space mean speed in ramp influence area, S = -23.2 mph
R
Space mean speed in outer lanes, S = 56.1 mph
O
Space mean speed for all vehicles, S = mph

Average passenger-car speed, S 60.3 mi/h
 Number of lanes, N 2
 Density, D 34.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3845 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 991 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2061 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2061 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 59.8 mi/h
 Number of lanes, N 2
 Density, D 34.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3820 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 985 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2087 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2087 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7850 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 970 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	7850	970	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	2023	250	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 8578 1025 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 4318$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	8578	9400	No
Fi F			
$v = v - v$	7553	9400	No
FO F R			
v	1025	2100	No
R			
$v v$	2130 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4318	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 36.9$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.390$
S
Space mean speed in ramp influence area, $S = 56.0$ mph
R
Space mean speed in outer lanes, $S = 66.9$ mph
0
Space mean speed for all vehicles, $S = 60.9$ mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 6150 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	6150	1580	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1585	407	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6594	1670	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6594$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6594	4700	Yes
Fi F			
$v = v - v$	4924	4700	Yes
FO F R			
v	1670	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	6594	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 58.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.448$
S
Space mean speed in ramp influence area, $S = 54.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4570 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 250 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4570	250	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1178	64	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4900	264	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4900$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5164	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4900	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 42.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.978
S
Space mean speed in ramp influence area, S = 42.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 42.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4820 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 480 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4820	480	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1242	124	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5168	507	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5168$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5675 4700 Yes
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5168	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 46.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.413
S
Space mean speed in ramp influence area, S = 32.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 32.5 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5300 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 840 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5300	840	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1366	216	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5682		888		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5682$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5682	4700	Yes
Fi F			
$v = v - v$	4794	4700	Yes
FO F R			
v	888	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5682	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 50.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.378$
S
Space mean speed in ramp influence area, $S = 56.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.3$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4460 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	25.0 mph
Volume on ramp	270 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4460	270	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1149	70	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4782	285	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4782 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5067	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4782	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 41.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.915
S
Space mean speed in ramp influence area, S = 44.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 44.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4730 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	220 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4730	220	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1219	57	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5071	232	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5071$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5303	4700	Yes
v v	0	pc/h	(Equation 25-4 or 25-5)
	3 or av34		
Is v v	> 2700	pc/h?	No
	3 or av34		
Is v v	> 1.5 v /2		No
	3 or av34	12	
If yes, v =			(Equation 25-8)
	12A		

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5071	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 43.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.060
S
Space mean speed in ramp influence area, S = 40.6 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 40.6 mph

Average passenger-car speed, S 64.5 mi/h
 Number of lanes, N 2
 Density, D 26.5 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riega Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3190 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 822 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1710 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1710 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 22.8 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2760 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 711 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1480 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1480 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1600 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 412 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 874 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 874 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	2	
Density, D	20.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V	2450	veh/h
Peak-hour factor, PHF	0.97	
Peak 15-min volume, v15	631	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1339	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h

Urban Freeway

LOS and Performance Measures

Flow rate, vp	1339	pc/h/ln
Free-flow speed, FFS	65.0	mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5490 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 620 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5490	620	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1415	160	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5999	655	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5999$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5999	4700	Yes
Fi F			
$v = v - v$	5344	4700	Yes
FO F R			
v	655	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5999	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 53.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.357$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4870 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 360 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4870	360	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1255	93	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5322	380	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5322 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5702 4700 Yes
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5322	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 46.6 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.464
S
Space mean speed in ramp influence area, S = 31.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 31.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5230 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5230	330	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1348	85	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5715	349	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5715 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6064	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5715	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 49.5 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.953
S
Space mean speed in ramp influence area, S = 20.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 20.1 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5560 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1070 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5560	1070	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1433	276	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	6076		1131		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6076$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	6076	4700	Yes
Fi F			
v = v - v	4945	4700	Yes
FO F R			
v	1131	4100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v	6076	4600	No
12			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 38.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D = 0.400
S
Space mean speed in ramp influence area, S = 55.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4490 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 370 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4490	370	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1157	95	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4907	391	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4907 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5298	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4907	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 43.5 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.076
S
Space mean speed in ramp influence area, S = 40.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 40.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4860 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	110 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4860	110	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1253	28	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5311	116	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5311$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5427	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5311	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 44.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.163
S
Space mean speed in ramp influence area, S = 38.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 38.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4970 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 940 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4970	940	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1281	242	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 5431 993 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5431$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5431	4700	Yes
Fi F			
$v = v - v$	4438	4700	No
FO F R			
v	993	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5431	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 37.5$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.127$
S
Space mean speed in ramp influence area, $S = 62.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3845 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 940 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3845	940	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	991	242	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4122	993	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 4122 \text{ pc/h}$
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5115	4700	Yes
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700 \text{ pc/h?}$		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4122	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.5 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.775
S
Space mean speed in ramp influence area, S = 47.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 47.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4935 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1115 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4935	1115	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1272	287	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5393	1178	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5393$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5393	4700	Yes
Fi F			
v = v - v	4215	4700	No
FO F R			
v	1178	2200	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5393	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 37.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.144$
S
Space mean speed in ramp influence area, $S = 61.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5035 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1115 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5035	1115	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1298	287	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5398	1178	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5398 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6576	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5398	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 46.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.925
S
Space mean speed in ramp influence area, S = -2.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = mph

Leisch Method for Weaving Analysis

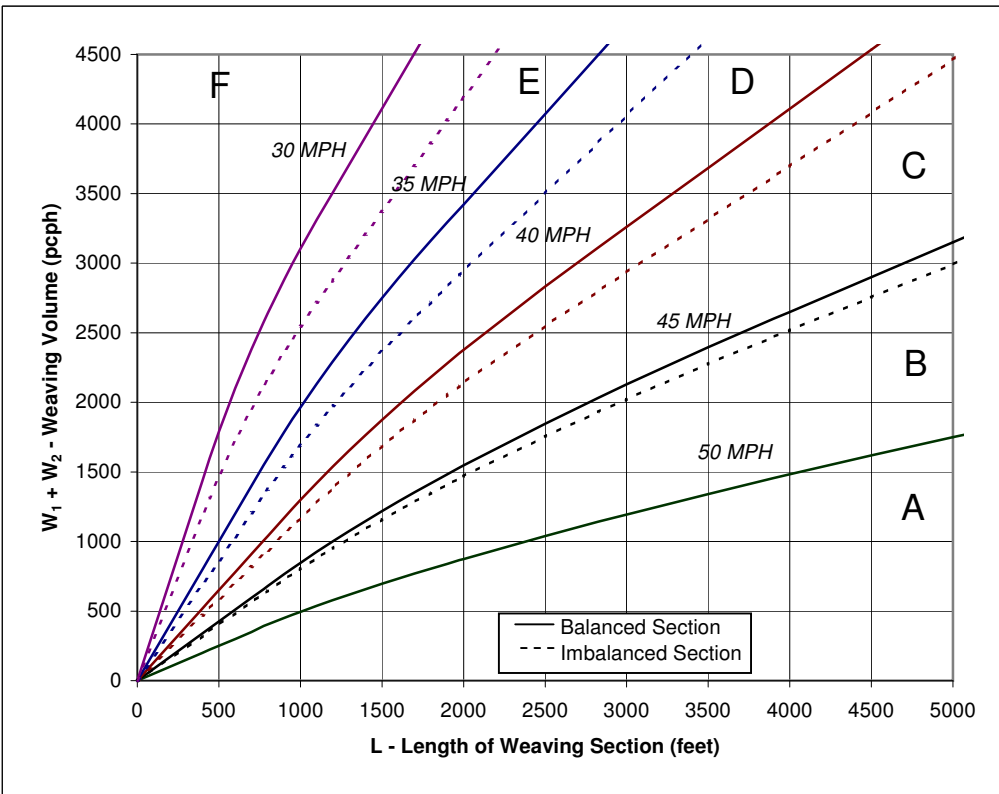
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

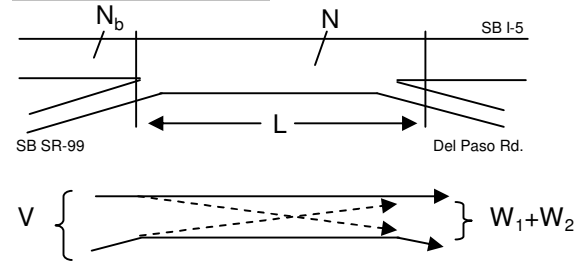
Project Information

Project	South Sutter County
Scenario	Cumulative PP NPP - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	7,850	Volume (vph)*	4,030	Volume (vph)*	970
Truck Percentage	12%	Truck Percentage	5%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	8,321	Volume (pcph)	4,131	Volume (pcph)	994



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- 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 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **9.5**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,577**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	8880	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	8880	5035
Lanes	3	2
Capacity Check	LOS F	LOS F

f_{HV}	0.9615
----------	--------

v_i	9520.825	pc/hr/ln
-------	----------	----------

Density, D	34.6	pc/mi/ln
-------------------	------	----------

LOS	LOS F
------------	-------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP NPP PM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"




































Sutter Pointe EIR
Cumulative Plus Project No PP AM

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	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	0.94	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	5085	1583	3433	5085	1583	1770	1863	1583	4990	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	1770	1863	1583	4990	1863	1583
Volume (vph)	10	620	20	680	2300	900	80	60	380	480	40	60
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)	11	674	22	739	2500	978	87	65	413	522	43	65
RTOR Reduction (vph)	0	0	13	0	0	0	0	0	0	0	0	57
Lane Group Flow (vph)	11	674	9	739	2500	978	87	65	413	522	43	8
Turn Type	Prot		Perm	Prot		Free	Prot		Free	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			Free			Free			8
Actuated Green, G (s)	0.8	50.4	50.4	29.7	79.3	120.0	8.9	10.9	120.0	13.0	15.0	15.0
Effective Green, g (s)	0.8	50.4	50.4	29.7	79.3	120.0	8.9	10.9	120.0	13.0	15.0	15.0
Actuated g/C Ratio	0.01	0.42	0.42	0.25	0.66	1.00	0.07	0.09	1.00	0.11	0.12	0.12
Clearance Time (s)	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
Lane Grp Cap (vph)	12	2136	665	850	3360	1583	131	169	1583	541	233	198
v/s Ratio Prot	0.01	0.13		c0.22	c0.49		0.05	0.03		c0.10	0.02	
v/s Ratio Perm			0.01			c0.62			0.26			0.01
v/c Ratio	0.92	0.32	0.01	0.87	0.74	0.62	0.66	0.38	0.26	0.96	0.18	0.04
Uniform Delay, d1	59.6	23.3	20.3	43.3	13.6	0.0	54.1	51.4	0.0	53.3	47.0	46.2
Progression Factor	1.00	1.00	1.00	1.14	0.51	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	212.2	0.4	0.0	2.9	0.4	0.5	12.0	1.5	0.4	29.7	0.4	0.1
Delay (s)	271.7	23.7	20.3	52.1	7.4	0.5	66.1	52.8	0.4	83.0	47.4	46.3
Level of Service	F	C	C	D	A	A	E	D	A	F	D	D
Approach Delay (s)		27.4			13.6			16.5			76.8	
Approach LOS		C			B			B			E	

Intersection Summary		
HCM Average Control Delay	22.0	HCM Level of Service C
HCM Volume to Capacity ratio	0.76	
Actuated Cycle Length (s)	120.0	Sum of lost time (s) 4.0
Intersection Capacity Utilization	73.6%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	0.86	1.00	0.94	0.86	1.00	0.94	0.95	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	4990	6408	1583	4990	3539	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	4990	6408	1583	4990	3539	1583	3433	5085	1583
Volume (vph)	290	1330	560	770	1580	110	450	170	180	140	370	560
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)	315	1446	609	837	1717	120	489	185	196	152	402	609
RTOR Reduction (vph)	0	0	0	0	0	60	0	0	0	0	0	0
Lane Group Flow (vph)	315	1446	609	837	1717	60	489	185	196	152	402	609
Turn Type	Prot		Free		Prot		Perm		Prot		Free	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			6			Free			Free
Actuated Green, G (s)	15.3	47.2	120.0	25.6	57.5	57.5	13.0	21.8	120.0	9.4	18.2	120.0
Effective Green, g (s)	15.3	47.2	120.0	25.6	57.5	57.5	13.0	21.8	120.0	9.4	18.2	120.0
Actuated g/C Ratio	0.13	0.39	1.00	0.21	0.48	0.48	0.11	0.18	1.00	0.08	0.15	1.00
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)	438	2520	1583	1065	3071	759	541	643	1583	269	771	1583
v/s Ratio Prot	0.09	0.23		c0.17	c0.27		c0.10	0.05		0.04	c0.08	
v/s Ratio Perm			c0.38			0.04			0.12			0.38
v/c Ratio	0.72	0.57	0.38	0.79	0.56	0.08	0.90	0.29	0.12	0.57	0.52	0.38
Uniform Delay, d1	50.3	28.5	0.0	44.6	22.2	16.9	52.9	42.4	0.0	53.3	46.9	0.0
Progression Factor	0.85	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	0.6	0.4	3.9	0.7	0.2	18.4	0.2	0.2	2.7	0.6	0.7
Delay (s)	46.4	36.2	0.4	48.5	23.0	17.1	71.3	42.6	0.2	56.0	47.5	0.7
Level of Service	D	D	A	D	C	B	E	D	A	E	D	A
Approach Delay (s)		28.4			30.7			49.2			24.1	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM Average Control Delay			31.1		HCM Level of Service						C	
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)						12.0	
Intersection Capacity Utilization			63.0%		ICU Level of Service						B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"































Sutter Pointe EIR
Cumulative Plus Project No PP PM

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	0.91	1.00	0.97	0.91	1.00	1.00	1.00	1.00	0.94	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	5085	1583	3433	5085	1583	1770	1863	1583	4990	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	1770	1863	1583	4990	1863	1583
Volume (vph)	10	1980	130	440	1010	1090	80	60	690	1530	140	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	2041	134	454	1041	1124	82	62	711	1577	144	10
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	10	2041	93	454	1041	1124	82	62	711	1577	144	3
Turn Type	Prot		Perm	Prot		Free	Prot		Free	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			Free			Free			8
Actuated Green, G (s)	2.0	60.1	60.1	18.4	76.5	150.0	12.2	11.5	150.0	44.0	43.3	43.3
Effective Green, g (s)	2.0	60.1	60.1	18.4	76.5	150.0	12.2	11.5	150.0	44.0	43.3	43.3
Actuated g/C Ratio	0.01	0.40	0.40	0.12	0.51	1.00	0.08	0.08	1.00	0.29	0.29	0.29
Clearance Time (s)	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
Lane Grp Cap (vph)	24	2037	634	421	2593	1583	144	143	1583	1464	538	457
v/s Ratio Prot	0.01	c0.40		c0.13	0.20		0.05	0.03		c0.32	0.08	
v/s Ratio Perm			0.06			c0.71			0.45			0.00
v/c Ratio	0.42	1.00	0.15	1.08	0.40	0.71	0.57	0.43	0.45	1.08	0.27	0.01
Uniform Delay, d1	73.4	45.0	28.6	65.8	22.6	0.0	66.4	66.1	0.0	53.0	41.1	38.0
Progression Factor	1.00	1.00	1.00	1.05	1.12	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	20.4	0.5	59.8	0.3	1.9	5.1	2.1	0.9	47.3	0.3	0.0
Delay (s)	84.7	65.4	29.1	128.8	25.7	1.9	71.5	68.2	0.9	100.3	41.4	38.0
Level of Service	F	E	C	F	C	A	E	E	A	F	D	D
Approach Delay (s)		63.2			33.4			12.6			95.1	
Approach LOS		E			C			B			F	

Intersection Summary		
HCM Average Control Delay	54.2	HCM Level of Service D
HCM Volume to Capacity ratio	1.00	
Actuated Cycle Length (s)	150.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	96.6%	ICU Level of Service F
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.97	0.86	1.00	0.94	0.86	1.00	0.94	0.95	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	4990	6408	1583	4990	3539	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	4990	6408	1583	4990	3539	1583	3433	5085	1583
Volume (vph)	860	1760	850	710	1270	190	1210	620	630	200	450	610
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	887	1814	876	732	1309	196	1247	639	649	206	464	629
RTOR Reduction (vph)	0	0	0	0	0	136	0	0	0	0	0	0
Lane Group Flow (vph)	887	1814	876	732	1309	60	1247	639	649	206	464	629
Turn Type	Prot		Free	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			Free			6			Free			Free
Actuated Green, G (s)	43.6	41.0	150.0	32.6	30.0	30.0	39.0	46.9	150.0	13.5	21.4	150.0
Effective Green, g (s)	43.6	41.0	150.0	32.6	30.0	30.0	39.0	46.9	150.0	13.5	21.4	150.0
Actuated g/C Ratio	0.29	0.27	1.00	0.22	0.20	0.20	0.26	0.31	1.00	0.09	0.14	1.00
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)	998	1752	1583	1084	1282	317	1297	1107	1583	309	725	1583
v/s Ratio Prot	c0.26	c0.28		0.15	0.20		c0.25	0.18		0.06	0.09	
v/s Ratio Perm			c0.55			0.04			0.41			0.40
v/c Ratio	0.89	1.04	0.55	0.68	1.02	0.19	0.96	0.58	0.41	0.67	0.64	0.40
Uniform Delay, d1	50.9	54.5	0.0	53.8	60.0	49.9	54.8	43.2	0.0	66.1	60.7	0.0
Progression Factor	0.91	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	24.0	0.6	1.7	30.6	1.3	16.6	0.7	0.8	5.4	1.9	0.7
Delay (s)	50.5	79.9	0.6	55.5	90.6	51.2	71.3	44.0	0.8	71.4	62.6	0.7
Level of Service	D	E	A	E	F	D	E	D	A	E	E	A
Approach Delay (s)		53.2			75.7			46.4			34.1	
Approach LOS		D			E			D			C	

















Intersection Summary

HCM Average Control Delay	54.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

CUMULATIVE CONDITIONS
PLUS PROJECT
WITH PLACER PARKWAY
























HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	10	10	10	10	10	10
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)	11	11	11	11	11	11	11	11	11	11	11	11
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	92	82	16	92	82	16	22			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92	82	16	92	82	16	22			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	864	798	1063	864	798	1063	1594			1594		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	33	33	33	33								
Volume Left	11	11	11	11								
Volume Right	11	11	11	11								
cSH	895	895	1594	1594								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	1								
Control Delay (s)	9.2	9.2	2.5	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	2.5	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization			13.3%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	0	1820	0	140	0	1230	960	430	2270	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1978	0	152	0	1337	1043	467	2467	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		1			1							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	4071	4739	1234	3505	4739	668	2467			1337		
vC1, stage 1 conf vol	3402	3402		1337	1337							
vC2, stage 2 conf vol	668	1337		2168	3402							
vCu, unblocked vol	4071	4739	1234	3505	4739	668	2467			1337		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	100	62	100			9		
cM capacity (veh/h)	0	0	168	4	1	400	185			512		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3
Volume Total	0	0	1978	0	152	0	668	668	1043	467	1234	1234
Volume Left	0	0	1978	0	0	0	0	0	0	467	0	0
Volume Right	0	0	0	0	152	0	0	0	1043	0	0	0
cSH	1700	1700	4	1700	400	1700	1700	1700	1700	512	1700	1700
Volume to Capacity	0.00	0.00	532.40	0.00	0.38	0.00	0.39	0.39	0.61	0.91	0.73	0.73
Queue Length 95th (ft)	0	0	Err	0	44	0	0	0	0	269	0	0
Control Delay (s)	0.0	0.0	Err	0.0	19.4	0.0	0.0	0.0	0.0	49.7	0.0	0.0
Lane LOS	A	A	F	A	C					E		
Approach Delay (s)	0.0		9286.2			0.0				7.9		
Approach LOS	A		F									
Intersection Summary												
Average Delay		2660.2										
Intersection Capacity Utilization		176.9%			ICU Level of Service					H		
Analysis Period (min)		15										

































HCM Signalized Intersection Capacity Analysis
4: Riego Rd & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project With PP AM

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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.97		1.00	0.88		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1751		1770	1806		1770	1631		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1751		1770	1806		1770	1631		1770	1723	
Volume (vph)	10	90	60	140	40	10	10	10	50	10	10	10
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)	11	98	65	152	43	11	11	11	54	11	11	11
RTOR Reduction (vph)	0	41	0	0	7	0	0	36	0	0	7	0
Lane Group Flow (vph)	11	122	0	152	47	0	11	29	0	11	15	0
Turn Type	Prot		Prot		Prot		Prot		Prot			
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	14.5		9.3	23.1		0.7	19.7		0.7	19.7	
Effective Green, g (s)	0.7	14.5		9.3	23.1		0.7	19.7		0.7	19.7	
Actuated g/C Ratio	0.01	0.24		0.15	0.38		0.01	0.33		0.01	0.33	
Clearance Time (s)	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	
Lane Grp Cap (vph)	21	422		273	693		21	534		21	564	
v/s Ratio Prot	0.01	c0.07		c0.09	0.03		c0.01	c0.02		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.52	0.29		0.56	0.07		0.52	0.05		0.52	0.03	
Uniform Delay, d1	29.6	18.6		23.5	11.7		29.6	13.9		29.6	13.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.6	0.4		2.5	0.0		21.6	0.0		21.6	0.0	
Delay (s)	51.2	19.0		26.0	11.8		51.2	13.9		51.2	13.8	
Level of Service	D	B		C	B		D	B		D	B	
Approach Delay (s)		21.1			22.3			19.3			26.2	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM Average Control Delay			21.6	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			60.2	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			33.4%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	2888	1583	1770	3343	1583
Volume (vph)	320	540	590	1510	1070	90	1570	1780	1740	150	2590	1350
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)	348	587	641	1641	1163	98	1707	1935	1891	163	2815	1467
RTOR Reduction (vph)	0	0	376	0	0	57	0	0	0	0	0	0
Lane Group Flow (vph)	348	587	265	1641	1163	41	1707	1935	1891	163	2815	1467
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	7.0	16.0	16.0	26.0	35.0	35.0	50.0	87.0	160.0	15.0	52.0	160.0
Effective Green, g (s)	7.0	16.0	16.0	26.0	35.0	35.0	50.0	87.0	160.0	15.0	52.0	160.0
Actuated g/C Ratio	0.04	0.10	0.10	0.16	0.22	0.22	0.31	0.54	1.00	0.09	0.32	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	150	509	158	558	1112	346	553	1570	1583	166	1086	1583
v/s Ratio Prot	0.10	0.12		c0.48	0.23		c0.96	0.67		0.09	c0.84	
v/s Ratio Perm			c0.17			0.03			1.19			0.93
v/c Ratio	2.32	1.15	1.68	2.94	1.05	0.12	3.09	1.23	1.19	0.98	2.59	0.93
Uniform Delay, d1	76.5	72.0	72.0	67.0	62.5	50.1	55.0	36.5	80.0	72.4	54.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	614.4	89.5	330.2	878.2	39.8	0.2	943.9	110.4	94.1	64.2	719.1	10.8
Delay (s)	690.9	161.5	402.2	945.2	102.3	50.3	998.9	146.9	174.1	136.5	773.1	10.8
Level of Service	F	F	F	F	F	D	F	F	F	F	F	B
Approach Delay (s)		376.3			577.2			419.0			498.2	
Approach LOS		F			F			F			F	

























Intersection Summary

HCM Average Control Delay	470.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.72		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	225.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group













HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	0.97	0.86	1.00	0.97	0.86	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	940	950	10	60	1870	310	60	30	10	260	10	550
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)	1022	1033	11	65	2033	337	65	33	11	283	11	598
RTOR Reduction (vph)	0	0	5	0	0	126	0	0	9	0	0	351
Lane Group Flow (vph)	1022	1033	6	65	2033	211	65	33	2	283	11	247
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	53.0	103.1	103.1	6.9	57.0	57.0	5.0	28.8	28.8	26.0	49.8	49.8
Effective Green, g (s)	53.0	103.1	103.1	6.9	57.0	57.0	5.0	28.8	28.8	26.0	49.8	49.8
Actuated g/C Ratio	0.29	0.57	0.57	0.04	0.32	0.32	0.03	0.16	0.16	0.14	0.28	0.28
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)	1006	3654	903	131	2020	499	95	564	252	494	975	436
v/s Ratio Prot	c0.30	0.16		0.02	c0.32		0.02	0.01		c0.08	0.00	
v/s Ratio Perm			0.00			0.13			0.00			c0.16
v/c Ratio	1.02	0.28	0.01	0.50	1.01	0.42	0.68	0.06	0.01	0.57	0.01	0.57
Uniform Delay, d1	63.9	19.9	16.8	85.2	61.9	48.9	87.1	64.5	64.0	72.2	47.6	56.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.4	0.2	0.0	2.9	21.6	2.6	18.5	0.0	0.0	4.8	0.0	5.3
Delay (s)	96.3	20.1	16.8	88.2	83.5	51.5	105.6	64.5	64.0	77.0	47.6	61.5
Level of Service	F	C	B	F	F	D	F	E	E	E	D	E
Approach Delay (s)		57.8			79.2			89.0			66.3	
Approach LOS		E			E			F			E	
Intersection Summary												
HCM Average Control Delay			69.2			HCM Level of Service		E				
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			180.8			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			78.0%			ICU Level of Service		D				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	920	10	0	2110	0	0	0	20	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1000	11	0	2293	0	0	0	22	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)												
pX, platoon unblocked												
vC, conflicting volume	2293			1011			1764	3293	333	2649	3304	764
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2293			1011			1764	3293	333	2649	3304	764
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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			100			100	100	97	100	100	100
cM capacity (veh/h)	217			681			53	9	662	11	8	346
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1				
Volume Total	333	333	333	11	764	764	764	22				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	11	0	0	0	22				
cSH	1700	1700	1700	1700	1700	1700	1700	662				
Volume to Capacity	0.20	0.20	0.20	0.01	0.45	0.45	0.45	0.03				
Queue Length 95th (ft)	0	0	0	0	0	0	0	3				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6				
Lane LOS								B				
Approach Delay (s)	0.0				0.0			10.6				
Approach LOS								B				
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization		44.1%		ICU Level of Service	A							
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Cumulative Plus Project With PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↗	↗
Sign Control		Stop	Stop		Stop	
Volume (vph)	30	910	2000	80	150	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	989	2174	87	163	120
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	1022	2174	87	283		
Volume Left (vph)	33	0	0	163		
Volume Right (vph)	0	0	87	120		
Hadj (s)	0.04	0.03	-0.67	-0.10		
Departure Headway (s)	6.1	6.4	5.7	6.9		
Degree Utilization, x	1.73	3.89	0.14	0.54		
Capacity (veh/h)	603	566	619	521		
Control Delay (s)	349.8	1315.9	8.5	17.6		
Approach Delay (s)	349.8	1265.6		17.6		
Approach LOS	F	F		C		
Intersection Summary						
Delay			904.2			
HCM Level of Service			F			
Intersection Capacity Utilization			127.0%		ICU Level of Service	H
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗		↖	↘	↗
Sign Control	Stop			Stop	Stop	
Volume (vph)	800	260	100	1190	890	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	870	283	109	1293	967	22
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	870	283	1402	989		
Volume Left (vph)	0	0	109	967		
Volume Right (vph)	0	283	0	22		
Hadj (s)	0.03	-0.67	0.05	0.22		
Departure Headway (s)	7.6	6.9	7.1	7.2		
Degree Utilization, x	1.84	0.54	2.77	1.97		
Capacity (veh/h)	479	517	509	509		
Control Delay (s)	403.4	16.6	818.6	462.6		
Approach Delay (s)	308.5		818.6	462.6		
Approach LOS	F		F	F		
Intersection Summary						
Delay			553.4			
HCM Level of Service			F			
Intersection Capacity Utilization			170.8%	ICU Level of Service	H	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	760	50	90	1160	50	120	10	50	40	10	10
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)	11	826	54	98	1261	54	130	11	54	43	11	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	891	1413	196	65								
Volume Left (vph)	11	98	130	43								
Volume Right (vph)	54	54	54	11								
Hadj (s)	0.00	0.02	0.00	0.07								
Departure Headway (s)	6.0	6.0	7.4	8.1								
Degree Utilization, x	1.48	2.35	0.40	0.15								
Capacity (veh/h)	592	613	480	423								
Control Delay (s)	240.0	626.2	15.2	12.5								
Approach Delay (s)	240.0	626.2	15.2	12.5								
Approach LOS	F	F	C	B								
Intersection Summary												
Delay			429.8									
HCM Level of Service			F									
Intersection Capacity Utilization			134.5%	ICU Level of Service	H							
Analysis Period (min)			15									





































HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

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	0.91	1.00	1.00	0.91	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	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	730	70	190	1240	60	100	50	210	100	40	10
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)	11	793	76	207	1348	65	109	54	228	109	43	11
RTOR Reduction (vph)	0	0	55	0	0	38	0	0	200	0	0	10
Lane Group Flow (vph)	11	793	21	207	1348	27	109	54	28	109	43	1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	0.6	28.3	28.3	15.3	43.0	43.0	33.8	12.7	12.7	29.4	8.3	8.3
Effective Green, g (s)	0.6	28.3	28.3	15.3	43.0	43.0	33.8	12.7	12.7	29.4	8.3	8.3
Actuated g/C Ratio	0.01	0.28	0.28	0.15	0.42	0.42	0.33	0.12	0.12	0.29	0.08	0.08
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)	10	1415	441	266	2150	669	588	233	198	512	152	129
v/s Ratio Prot	0.01	0.16		c0.12	c0.27		c0.06	c0.03		c0.06	0.02	
v/s Ratio Perm			0.01			0.02			0.02			0.00
v/c Ratio	1.10	0.56	0.05	0.78	0.63	0.04	0.19	0.23	0.14	0.21	0.28	0.01
Uniform Delay, d1	50.6	31.4	26.8	41.6	23.1	17.2	24.2	40.1	39.7	27.4	43.9	42.9
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	321.8	0.5	0.0	13.4	1.4	0.1	0.7	0.5	0.3	0.9	1.0	0.0
Delay (s)	372.4	31.9	26.9	54.9	24.4	17.4	24.9	40.6	40.0	28.3	44.9	42.9
Level of Service	F	C	C	D	C	B	C	D	D	C	D	D
Approach Delay (s)		35.7			28.1			35.9			33.7	
Approach LOS		D			C			D			C	
Intersection Summary												
HCM Average Control Delay			31.6				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			101.7				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			49.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c	Critical Lane Group											


































HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project With PP AM

													
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583	
Volume (vph)	730	1240	130	640	1480	20	140	920	610	30	860	910	
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)	793	1348	141	696	1609	22	152	1000	663	33	935	989	
RTOR Reduction (vph)	0	0	56	0	0	10	0	0	260	0	0	256	
Lane Group Flow (vph)	793	1348	85	696	1609	12	152	1000	403	33	935	733	
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
Protected Phases	5	2		1	6		7	4		3	8		
Permitted Phases			2			6			4			8	
Actuated Green, G (s)	26.0	39.9	39.9	29.5	43.0	43.0	5.0	55.3	55.3	3.2	53.5	53.5	
Effective Green, g (s)	26.0	41.9	41.9	29.1	45.0	45.0	5.0	55.6	55.6	3.2	53.8	53.8	
Actuated g/C Ratio	0.18	0.29	0.29	0.20	0.31	0.31	0.03	0.38	0.38	0.02	0.37	0.37	
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.3	
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0	
Lane Grp Cap (vph)	612	1461	455	685	1569	489	118	1939	604	75	1876	584	
v/s Ratio Prot	c0.23	0.27		0.20	c0.32		c0.04	0.20		0.01	0.18		
v/s Ratio Perm			0.05			0.01			0.25			c0.46	
v/c Ratio	1.30	0.92	0.19	1.02	1.03	0.02	1.29	0.52	0.67	0.44	0.50	1.25	
Uniform Delay, d1	59.9	50.4	39.1	58.4	50.4	35.1	70.4	34.7	37.4	70.4	35.6	46.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	144.9	9.8	0.1	38.5	29.4	0.0	179.0	0.1	2.2	4.1	0.1	128.2	
Delay (s)	204.8	60.2	39.2	96.8	79.8	35.1	249.4	34.8	39.6	74.5	35.6	174.2	
Level of Service	F	E	D	F	E	D	F	C	D	E	D	F	
Approach Delay (s)	109.2				84.5		54.5				106.3		
Approach LOS	F				F		D				F		
Intersection Summary													
HCM Average Control Delay	89.8		HCM Level of Service				F						
HCM Volume to Capacity ratio	1.18												
Actuated Cycle Length (s)	145.8				Sum of lost time (s)				16.0				
Intersection Capacity Utilization	98.9%				ICU Level of Service				F				
Analysis Period (min)	15												
c Critical Lane Group													

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	320	920	40	270	990	400	10	1200	280	360	820	640
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)	348	1000	43	293	1076	435	11	1304	304	391	891	696
RTOR Reduction (vph)	0	0	32	0	0	122	0	0	149	0	0	173
Lane Group Flow (vph)	348	1000	11	293	1076	313	11	1304	155	391	891	523
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	12.0	29.3	29.3	11.7	29.0	29.0	0.6	44.2	44.2	13.0	56.6	56.6
Effective Green, g (s)	12.0	31.3	31.3	11.7	31.0	31.0	0.6	46.2	46.2	13.0	58.6	58.6
Actuated g/C Ratio	0.10	0.26	0.26	0.10	0.26	0.26	0.01	0.39	0.39	0.11	0.50	0.50
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	349	1347	419	340	1334	415	17	1383	619	378	1755	785
v/s Ratio Prot	c0.10	0.20		0.09	c0.21		0.00	c0.37		c0.11	0.25	
v/s Ratio Perm			0.01			0.20			0.10			0.33
v/c Ratio	1.00	0.74	0.03	0.86	0.81	0.75	0.65	0.94	0.25	1.03	0.51	0.67
Uniform Delay, d1	53.1	39.8	32.2	52.5	40.8	40.1	58.7	34.7	24.3	52.6	20.1	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	47.1	2.6	0.1	18.9	4.1	8.8	49.2	13.3	0.4	55.5	0.5	2.7
Delay (s)	100.2	42.4	32.2	71.4	44.9	48.8	107.9	48.0	24.7	108.1	20.5	25.2
Level of Service	F	D	C	E	D	D	F	D	C	F	C	C
Approach Delay (s)		56.5			50.2			44.0			39.5	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay			46.9			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			118.2	Sum of lost time (s)			16.0					
Intersection Capacity Utilization			85.0%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	50	20	10	30	30	290	20	80	10	310	40	40
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)	54	22	11	33	33	315	22	87	11	337	43	43
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	87	380	120	424								
Volume Left (vph)	54	33	22	337								
Volume Right (vph)	11	315	11	43								
Hadj (s)	0.08	-0.45	0.02	0.13								
Departure Headway (s)	6.3	5.2	6.0	5.6								
Degree Utilization, x	0.15	0.55	0.20	0.65								
Capacity (veh/h)	485	649	524	619								
Control Delay (s)	10.4	14.4	10.5	18.5								
Approach Delay (s)	10.4	14.4	10.5	18.5								
Approach LOS	B	B	B	C								
Intersection Summary												
Delay			15.3									
HCM Level of Service			C									
Intersection Capacity Utilization			55.9%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

												
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	330	10	0	850	710	0	0	200	0	0	70
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	359	11	0	924	772	0	0	217	0	0	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.27						0.27	0.27		0.27	0.27	0.27
vC, conflicting volume	1696			370			1750	2060	364	1891	1679	1310
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3557			370			3757	4896	364	4277	3498	2139
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			100			0	100	68	100	100	0
cM capacity (veh/h)	19			1189			0	0	681	0	2	17
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	370	1696	217	76								
Volume Left	0	0	0	0								
Volume Right	11	772	217	76								
cSH	1700	1700	681	17								
Volume to Capacity	0.22	1.00	0.32	4.53								
Queue Length 95th (ft)	0	0	34	Err								
Control Delay (s)	0.0	0.0	12.7	Err								
Lane LOS			B	F								
Approach Delay (s)	0.0	0.0	12.7	Err								
Approach LOS			B	F								
Intersection Summary												
Average Delay			323.7									
Intersection Capacity Utilization			99.1%		ICU Level of Service				F			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd



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	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.97	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	3539	1863	1583	1735	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	3539	1863	1583	1735	
Volume (vph)	60	470	1490	10	210	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	511	1620	11	228	76
RTOR Reduction (vph)	0	0	0	2	9	0
Lane Group Flow (vph)	65	511	1620	9	296	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		4	
Permitted Phases				6		
Actuated Green, G (s)	4.0	111.0	103.0	103.0	21.0	
Effective Green, g (s)	4.0	111.0	103.0	103.0	21.0	
Actuated g/C Ratio	0.03	0.79	0.74	0.74	0.15	
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)	51	2806	1371	1165	260	
v/s Ratio Prot	c0.04	0.14	c0.87		c0.17	
v/s Ratio Perm				0.01		
v/c Ratio	1.27	0.18	1.18	0.01	1.14	
Uniform Delay, d1	68.0	3.5	18.5	4.9	59.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	216.9	0.0	89.5	0.0	97.7	
Delay (s)	284.9	3.5	108.0	4.9	157.2	
Level of Service	F	A	F	A	F	
Approach Delay (s)		35.3	107.3		157.2	
Approach LOS		D	F		F	

Intersection Summary

HCM Average Control Delay	96.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd



































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	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)	220	870	1470	160	310	320
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	946	1598	174	337	348
RTOR Reduction (vph)	0	0	0	90	0	239
Lane Group Flow (vph)	239	946	1598	84	337	109
Turn Type	Prot		Perm		Perm	
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	14.8	57.9	39.1	39.1	23.0	23.0
Effective Green, g (s)	14.8	57.9	39.1	39.1	23.0	23.0
Actuated g/C Ratio	0.17	0.65	0.44	0.44	0.26	0.26
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)	295	2305	1557	696	458	410
v/s Ratio Prot	c0.14	0.27	c0.45		c0.19	
v/s Ratio Perm				0.05		0.07
v/c Ratio	0.81	0.41	1.03	0.12	0.74	0.27
Uniform Delay, d1	35.7	7.4	24.9	14.7	30.2	26.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.4	0.1	29.8	0.4	10.1	1.6
Delay (s)	51.1	7.5	54.7	15.1	40.3	27.8
Level of Service	D	A	D	B	D	C
Approach Delay (s)		16.3	50.8		33.9	
Approach LOS		B	D		C	

Intersection Summary

HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			








































HCM Signalized Intersection Capacity Analysis
19: Elverta Rd & 16th St

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	320	610	280	260	950	330	290	430	130	170	680	280
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)	348	663	304	283	1033	359	315	467	141	185	739	304
RTOR Reduction (vph)	0	0	171	0	0	195	0	0	103	0	0	193
Lane Group Flow (vph)	348	663	133	283	1033	164	315	467	38	185	739	111
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2			1	6			7	4		
Permitted Phases			2				6				8	
Actuated Green, G (s)	11.0	29.8	29.8	11.2	30.0	30.0	10.0	24.3	24.3	8.7	23.0	23.0
Effective Green, g (s)	11.0	29.8	29.8	11.2	30.0	30.0	10.0	24.3	24.3	8.7	23.0	23.0
Actuated g/C Ratio	0.12	0.33	0.33	0.12	0.33	0.33	0.11	0.27	0.27	0.10	0.26	0.26
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)	420	1172	524	427	1180	528	381	956	427	332	904	405
v/s Ratio Prot	c0.10	0.19			0.08	c0.29			c0.09	0.13	0.05	c0.21
v/s Ratio Perm			0.08				0.10				0.07	
v/c Ratio	0.83	0.57	0.25	0.66	0.88	0.31	0.83	0.49	0.09	0.56	0.82	0.27
Uniform Delay, d1	38.6	24.8	22.0	37.6	28.2	22.3	39.2	27.6	24.6	38.8	31.5	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.7	2.0	1.2	3.8	9.2	1.5	13.7	1.8	0.4	2.0	8.1	1.7
Delay (s)	51.2	26.8	23.1	41.4	37.4	23.8	52.8	29.4	25.0	40.8	39.6	28.5
Level of Service	D	C	C	D	D	C	D	C	C	D	D	C
Approach Delay (s)	32.4				35.2				36.7		37.1	
Approach LOS	C				D				D		D	
Intersection Summary												
HCM Average Control Delay			35.2		HCM Level of Service				D			
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			75.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave













Sutter Pointe EIR
Cumulative Plus Project With PP AM

													
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583	
Volume (vph)	720	320	450	410	820	410	740	1140	100	210	1370	670	
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)	783	348	489	446	891	446	804	1239	109	228	1489	728	
RTOR Reduction (vph)	0	0	211	0	0	154	0	0	64	0	0	229	
Lane Group Flow (vph)	783	348	278	446	891	292	804	1239	45	228	1489	499	
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
Protected Phases	3	8		7	4		1	6		5	2		
Permitted Phases			8			4			6			2	
Actuated Green, G (s)	26.5	37.2	37.2	20.0	31.0	31.0	26.5	53.1	53.1	12.3	38.9	38.9	
Effective Green, g (s)	28.0	38.9	38.9	21.5	32.4	32.4	28.0	54.8	54.8	13.8	40.6	40.6	
Actuated g/C Ratio	0.19	0.27	0.27	0.15	0.22	0.22	0.19	0.38	0.38	0.10	0.28	0.28	
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7	
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4	
Lane Grp Cap (vph)	663	1364	425	509	1136	354	663	1922	598	327	1424	443	
v/s Ratio Prot	c0.23	0.07		0.13	0.18		c0.23	0.24		0.07	0.29		
v/s Ratio Perm			0.18			c0.18			0.03			c0.32	
v/c Ratio	1.18	0.26	0.65	0.88	0.78	0.83	1.21	0.64	0.08	0.70	1.05	1.13	
Uniform Delay, d1	58.5	41.7	47.1	60.4	53.0	53.6	58.5	37.1	28.9	63.6	52.2	52.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	96.4	0.3	5.6	15.1	4.2	16.1	109.3	1.1	0.1	5.2	36.7	82.0	
Delay (s)	154.9	41.9	52.7	75.5	57.2	69.7	167.8	38.2	29.0	68.7	88.9	134.2	
Level of Service	F	D	D	E	E	E	F	D	C	E	F	F	
Approach Delay (s)		99.8			64.9			86.1			100.5		
Approach LOS		F			E			F			F		

Intersection Summary		
HCM Average Control Delay	88.6	HCM Level of Service F
HCM Volume to Capacity ratio	1.08	
Actuated Cycle Length (s)	145.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	97.3%	ICU Level of Service F
Analysis Period (min)	15	
c Critical Lane Group		













HCM Signalized Intersection Capacity Analysis
21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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
Lane Util. Factor		0.91	1.00		0.95	1.00				0.97		1.00
Frt		1.00	0.85		1.00	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		5085	1583		3539	1583				3433		1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		5085	1583		3539	1583				3433		1583
Volume (vph)	0	500	170	0	710	960	0	0	0	360	0	220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	543	185	0	772	1043	0	0	0	391	0	239
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	77
Lane Group Flow (vph)	0	543	185	0	772	1043	0	0	0	391	0	162
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					8		
Permitted Phases			Free			Free						8
Actuated Green, G (s)		24.4	44.3		24.4	44.3				11.9		11.9
Effective Green, g (s)		24.4	44.3		24.4	44.3				11.9		11.9
Actuated g/C Ratio		0.55	1.00		0.55	1.00				0.27		0.27
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		2801	1583		1949	1583				922		425
v/s Ratio Prot		0.11			0.22					0.11		
v/s Ratio Perm			0.12			0.66						0.10
v/c Ratio		0.19	0.12		0.40	0.66				0.42		0.38
Uniform Delay, d1		5.0	0.0		5.7	0.0				13.4		13.2
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.0	0.2		0.6	2.2				0.3		0.6
Delay (s)		5.0	0.2		6.3	2.2				13.7		13.8
Level of Service		A	A		A	A				B		B
Approach Delay (s)		3.8			3.9			0.0			13.7	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM Average Control Delay			5.8				HCM Level of Service			A		
HCM Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			44.3				Sum of lost time (s)			0.0		
Intersection Capacity Utilization			39.9%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

												
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		0.95	1.00		0.91	1.00	0.97		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3539	1583		5085	1583	3433		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3539	1583		5085	1583	3433		1583			
Volume (vph)	0	620	240	0	1510	710	160	0	420	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)	0	674	261	0	1641	772	174	0	457	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	674	261	0	1641	772	174	0	457	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		36.0	54.2		36.0	54.2	10.2		54.2			
Effective Green, g (s)		36.0	54.2		36.0	54.2	10.2		54.2			
Actuated g/C Ratio		0.66	1.00		0.66	1.00	0.19		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2351	1583		3377	1583	646		1583			
v/s Ratio Prot		0.19			0.32		0.05					
v/s Ratio Perm			0.16			0.49			0.29			
v/c Ratio		0.29	0.16		0.49	0.49	0.27		0.29			
Uniform Delay, d1		3.8	0.0		4.5	0.0	18.8		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.3	0.2		0.1	1.1	0.2		0.5			
Delay (s)		4.1	0.2		4.6	1.1	19.0		0.5			
Level of Service		A	A		A	A	B		A			
Approach Delay (s)		3.0			3.5			5.6			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			3.7				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			54.2				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			40.4%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	0.91		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	5085		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		5085	1583	1770	5085		1770		1583			
Volume (vph)	0	590	120	800	1470	0	200	0	470	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)	0	641	130	870	1598	0	217	0	511	0	0	0
RTOR Reduction (vph)	0	0	106	0	0	0	0	0	424	0	0	0
Lane Group Flow (vph)	0	641	24	870	1598	0	217	0	87	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		16.5	16.5	50.9	70.9		16.9		16.9			
Effective Green, g (s)		18.0	18.0	50.4	72.4		16.4		16.4			
Actuated g/C Ratio		0.19	0.19	0.52	0.75		0.17		0.17			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		946	294	922	3803		300		268			
v/s Ratio Prot		c0.13		c0.49	0.31		c0.12					
v/s Ratio Perm			0.02						0.05			
v/c Ratio		0.68	0.08	0.94	0.42		0.72		0.32			
Uniform Delay, d1		36.7	32.6	21.9	4.5		38.1		35.3			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		1.9	0.1	17.3	0.1		7.1		0.3			
Delay (s)		38.6	32.7	39.2	4.6		45.2		35.6			
Level of Service		D	C	D	A		D		D			
Approach Delay (s)		37.6			16.8			38.4			0.0	
Approach LOS		D			B			D			A	
Intersection Summary												
HCM Average Control Delay			24.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			96.8			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			76.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c	Critical Lane Group											























HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

												
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
Lane Util. Factor	1.00	0.91			0.91	1.00				1.00	1.00	1.00
Frt	1.00	1.00			1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	1770	5085			5085	1583				1770	1583	1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	1770	5085			5085	1583				1770	1583	1583
Volume (vph)	160	1030	0	0	2010	10	0	0	0	30	0	130
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)	174	1120	0	0	2185	11	0	0	0	33	0	141
RTOR Reduction (vph)	0	0	0	0	0	5	0	0	0	0	0	126
Lane Group Flow (vph)	174	1120	0	0	2185	6	0	0	0	33	0	15
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				8			
Permitted Phases					6							8
Actuated Green, G (s)	9.5	51.6			38.1	38.1				7.3		7.3
Effective Green, g (s)	9.5	51.6			38.1	38.1				7.3		7.3
Actuated g/C Ratio	0.14	0.77			0.57	0.57				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)	251	3922			2896	902				193		173
v/s Ratio Prot	c0.10	0.22			c0.43				c0.02			
v/s Ratio Perm						0.00						0.01
v/c Ratio	0.69	0.29			0.75	0.01				0.17		0.09
Uniform Delay, d1	27.3	2.2			10.9	6.2				27.1		26.8
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	8.0	0.0			1.2	0.0				0.4		0.2
Delay (s)	35.3	2.3			12.0	6.2				27.5		27.0
Level of Service	D	A			B	A				C		C
Approach Delay (s)		6.7			12.0			0.0			27.1	
Approach LOS		A			B			A			C	
Intersection Summary												
HCM Average Control Delay			10.9		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			66.9		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			61.0%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Road "O" & Road "H"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	0.93		1.00	0.93		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1723		1770	1863	1583	1770	1851	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1723		1770	1723		1770	1863	1583	1770	1851	
Volume (vph)	10	10	10	20	10	10	10	540	20	10	240	10
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)	11	11	11	22	11	11	11	587	22	11	261	11
RTOR Reduction (vph)	0	11	0	0	10	0	0	0	6	0	1	0
Lane Group Flow (vph)	11	11	0	22	12	0	11	587	16	11	271	0
Turn Type	Prot			Prot			Prot			Perm	Prot	
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases									2			
Actuated Green, G (s)	0.8	3.6		1.6	4.4		0.8	60.0	60.0	0.8	60.0	
Effective Green, g (s)	0.8	3.6		1.6	4.4		0.8	60.0	60.0	0.8	60.0	
Actuated g/C Ratio	0.01	0.04		0.02	0.05		0.01	0.73	0.73	0.01	0.73	
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)	17	76		35	92		17	1363	1158	17	1354	
v/s Ratio Prot	0.01	0.01		c0.01	c0.01		c0.01	c0.32		0.01	0.15	
v/s Ratio Perm									0.01			
v/c Ratio	0.65	0.15		0.63	0.13		0.65	0.43	0.01	0.65	0.20	
Uniform Delay, d1	40.5	37.7		39.9	37.0		40.5	4.3	3.0	40.5	3.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	62.0	0.9		30.3	0.6		62.0	0.2	0.0	62.0	0.1	
Delay (s)	102.5	38.7		70.3	37.6		102.5	4.5	3.0	102.5	3.5	
Level of Service	F	D		E	D		F	A	A	F	A	
Approach Delay (s)		59.9			53.9			6.2			7.4	
Approach LOS		E			D			A			A	
Intersection Summary												
HCM Average Control Delay			10.5				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			82.0				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			42.9%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												






















HCM Signalized Intersection Capacity Analysis
26: Road "O" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1757		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1757		1770	3539	1583	1770	3539	1583
Volume (vph)	10	30	370	370	50	30	690	480	250	10	130	20
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)	11	33	402	402	54	33	750	522	272	11	141	22
RTOR Reduction (vph)	0	0	73	0	15	0	0	0	128	0	0	20
Lane Group Flow (vph)	11	33	329	402	72	0	750	522	144	11	141	2
Turn Type	Prot		pm+ov	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4	5	3	8		5	2		1		6
Permitted Phases			4						2			6
Actuated Green, G (s)	1.5	7.9	68.6	32.4	38.8		60.7	67.6	67.6	4.0	10.9	10.9
Effective Green, g (s)	1.5	7.9	68.6	32.4	38.8		60.7	67.6	67.6	4.0	10.9	10.9
Actuated g/C Ratio	0.01	0.06	0.54	0.25	0.30		0.47	0.53	0.53	0.03	0.09	0.09
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)	21	115	899	448	533		840	1870	837	55	302	135
v/s Ratio Prot	0.01	0.02	c0.17	c0.23	0.04		c0.42	0.15		0.01	c0.04	
v/s Ratio Perm			0.03						0.09			0.00
v/c Ratio	0.52	0.29	0.37	0.90	0.13		0.89	0.28	0.17	0.20	0.47	0.01
Uniform Delay, d1	62.8	57.3	17.1	46.1	32.4		30.6	16.7	15.6	60.4	55.7	53.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.6	1.4	0.3	20.1	0.1		11.8	0.1	0.1	1.8	1.1	0.0
Delay (s)	84.4	58.7	17.4	66.3	32.5		42.5	16.8	15.7	62.2	56.9	53.6
Level of Service	F	E	B	E	C		D	B	B	E	E	D
Approach Delay (s)		22.1			60.3			29.1			56.8	
Approach LOS		C			E			C			E	
Intersection Summary												
HCM Average Control Delay			35.5				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			127.9				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			79.0%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												






















HCM Signalized Intersection Capacity Analysis
27: Placer Parkway NB Ramps & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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				0.97		1.00		0.95	1.00		0.95	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				3433		1583		3539	1583		3539	1583
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				3433		1583		3539	1583		3539	1583
Volume (vph)	0	0	0	750	0	560	0	860	180	0	570	300
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	0	0	815	0	609	0	935	196	0	620	326
RTOR Reduction (vph)	0	0	0	0	0	19	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	815	0	590	0	935	196	0	620	326
Turn Type				Prot		custom			Free			Free
Protected Phases				8				2			6	
Permitted Phases						8			Free			Free
Actuated Green, G (s)				20.2		20.2		15.8	44.0		15.8	44.0
Effective Green, g (s)				20.2		20.2		15.8	44.0		15.8	44.0
Actuated g/C Ratio				0.46		0.46		0.36	1.00		0.36	1.00
Clearance Time (s)				4.0		4.0		4.0			4.0	
Vehicle Extension (s)				3.0		3.0		3.0			3.0	
Lane Grp Cap (vph)				1576		727		1271	1583		1271	1583
v/s Ratio Prot				0.24				c0.26			0.18	
v/s Ratio Perm						c0.37			0.12			0.21
v/c Ratio				0.52		0.81		0.74	0.12		0.49	0.21
Uniform Delay, d1				8.4		10.3		12.3	0.0		11.0	0.0
Progression Factor				1.00		1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2				0.3		6.9		2.3	0.2		0.3	0.3
Delay (s)				8.7		17.1		14.5	0.2		11.3	0.3
Level of Service				A		B		B	A		B	A
Approach Delay (s)		0.0			12.3			12.0			7.5	
Approach LOS		A			B			B			A	
Intersection Summary												
HCM Average Control Delay			10.9									HCM Level of Service B
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			44.0									Sum of lost time (s) 8.0
Intersection Capacity Utilization			65.1%									ICU Level of Service C
Analysis Period (min)			15									
c Critical Lane Group												































HCM Signalized Intersection Capacity Analysis
28: Placer Parkway SB Ramps & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

													
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	0.97		1.00					0.95	1.00		0.95	1.00	
Frt	1.00		0.85					1.00	0.85		1.00	0.85	
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00	
Satd. Flow (prot)	3433		1583					3539	1583		3539	1583	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00	
Satd. Flow (perm)	3433		1583					3539	1583		3539	1583	
Volume (vph)	350	0	340	0	0	0	0	690	490	0	1180	140	
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)	380	0	370	0	0	0	0	750	533	0	1283	152	
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	380	0	364	0	0	0	0	750	533	0	1283	152	
Turn Type	Prot		custom							Free		Free	
Protected Phases	4							2			6		
Permitted Phases			4						Free			Free	
Actuated Green, G (s)	14.8		14.8					18.3	41.1		18.3	41.1	
Effective Green, g (s)	14.8		14.8					18.3	41.1		18.3	41.1	
Actuated g/C Ratio	0.36		0.36					0.45	1.00		0.45	1.00	
Clearance Time (s)	4.0		4.0					4.0			4.0		
Vehicle Extension (s)	3.0		3.0					3.0			3.0		
Lane Grp Cap (vph)	1236		570					1576	1583		1576	1583	
v/s Ratio Prot	0.11							0.21			c0.36		
v/s Ratio Perm			c0.23						0.34			0.10	
v/c Ratio	0.31		0.64					0.48	0.34		0.81	0.10	
Uniform Delay, d1	9.5		10.9					8.0	0.0		9.9	0.0	
Progression Factor	1.00		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1		2.4					0.2	0.6		3.3	0.1	
Delay (s)	9.6		13.3					8.3	0.6		13.3	0.1	
Level of Service	A		B					A	A		B	A	
Approach Delay (s)		11.4			0.0			5.1			11.9		
Approach LOS		B			A			A			B		
Intersection Summary													
HCM Average Control Delay			9.3									HCM Level of Service	A
HCM Volume to Capacity ratio			0.74										
Actuated Cycle Length (s)			41.1									Sum of lost time (s)	8.0
Intersection Capacity Utilization			60.3%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
29: Road "K" & Road "C"

























Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Volume (vph)	330	70	150	150	110	190	580	660	150	200	620	700
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)	359	76	163	163	120	207	630	717	163	217	674	761
RTOR Reduction (vph)	0	0	140	0	0	180	0	0	98	0	0	348
Lane Group Flow (vph)	359	76	23	163	120	27	630	717	65	217	674	413
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	11.1	12.3	12.3	10.1	11.3	11.3	19.2	35.0	35.0	14.5	30.3	30.3
Effective Green, g (s)	11.1	12.3	12.3	10.1	11.3	11.3	19.2	35.0	35.0	14.5	30.3	30.3
Actuated g/C Ratio	0.13	0.14	0.14	0.11	0.13	0.13	0.22	0.40	0.40	0.16	0.34	0.34
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)	434	495	222	203	455	204	750	1409	630	292	1220	546
v/s Ratio Prot	c0.10	0.02		0.09	c0.03		c0.18	0.20		0.12	0.19	
v/s Ratio Perm			0.01			0.02			0.04			c0.26
v/c Ratio	0.83	0.15	0.10	0.80	0.26	0.13	0.84	0.51	0.10	0.74	0.55	0.76
Uniform Delay, d1	37.5	33.2	33.0	37.9	34.5	33.9	32.9	20.0	16.6	34.9	23.3	25.5
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	12.2	0.1	0.2	20.0	0.3	0.3	8.2	1.3	0.3	9.8	1.8	9.4
Delay (s)	49.7	33.4	33.2	58.0	34.9	34.2	41.1	21.3	16.9	44.7	25.1	35.0
Level of Service	D	C	C	E	C	C	D	C	B	D	C	C
Approach Delay (s)		43.1			42.3			29.1			32.2	
Approach LOS		D			D			C			C	

Intersection Summary		
HCM Average Control Delay	33.8	HCM Level of Service C
HCM Volume to Capacity ratio	0.71	
Actuated Cycle Length (s)	87.9	Sum of lost time (s) 16.0
Intersection Capacity Utilization	73.2%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
30: Road "J" & Road "H"

Sutter Pointe EIR
Cumulative Plus Project With PP AM














												
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	0.95	1.00	1.00	0.95	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	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	100	280	50	110	140	270	20	530	100	110	280	30
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)	109	304	54	120	152	293	22	576	109	120	304	33
RTOR Reduction (vph)	0	0	35	0	0	180	0	0	81	0	0	22
Lane Group Flow (vph)	109	304	19	120	152	113	22	576	28	120	304	11
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	6.6	24.7	24.7	6.1	24.2	24.2	1.4	18.5	18.5	6.7	23.8	23.8
Effective Green, g (s)	6.6	24.7	24.7	6.1	24.2	24.2	1.4	18.5	18.5	6.7	23.8	23.8
Actuated g/C Ratio	0.09	0.34	0.34	0.08	0.34	0.34	0.02	0.26	0.26	0.09	0.33	0.33
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)	162	639	543	150	626	532	34	909	407	165	1170	523
v/s Ratio Prot	0.06	c0.16		c0.07	0.08		0.01	c0.16		c0.07	0.09	
v/s Ratio Perm			0.01			0.07			0.02			0.01
v/c Ratio	0.67	0.48	0.03	0.80	0.24	0.21	0.65	0.63	0.07	0.73	0.26	0.02
Uniform Delay, d1	31.7	18.6	15.7	32.4	17.3	17.1	35.1	23.7	20.2	31.8	17.6	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.5	2.5	0.1	25.4	0.9	0.9	35.3	1.5	0.1	14.8	0.1	0.0
Delay (s)	42.1	21.1	15.8	57.8	18.2	18.0	70.3	25.2	20.3	46.5	17.8	16.3
Level of Service	D	C	B	E	B	B	E	C	C	D	B	B
Approach Delay (s)		25.4			26.5			25.8			25.2	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			25.8				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			72.0				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												

HCM Unsignalized Intersection Capacity Analysis
 31: Road "J" & Road "L"

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	280	100	50	130	50	150
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	304	109	54	141	54	163
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			413		554	304
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			413		554	304
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		88	78
cM capacity (veh/h)			1146		470	735
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	304	109	54	141	54	163
Volume Left	0	0	54	0	54	0
Volume Right	0	109	0	0	0	163
cSH	1700	1700	1146	1700	470	735
Volume to Capacity	0.18	0.06	0.05	0.08	0.12	0.22
Queue Length 95th (ft)	0	0	4	0	10	21
Control Delay (s)	0.0	0.0	8.3	0.0	13.7	11.3
Lane LOS			A		B	B
Approach Delay (s)	0.0		2.3		11.9	
Approach LOS					B	
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			31.4%		ICU Level of Service	A
Analysis Period (min)			15			




















HCM Signalized Intersection Capacity Analysis
32: Road "M" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3535		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3535		1770	3539
Volume (vph)	10	120	1200	10	50	910
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	130	1304	11	54	989
RTOR Reduction (vph)	0	113	1	0	0	0
Lane Group Flow (vph)	11	17	1314	0	54	989
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	8.8	8.8	43.1		2.4	49.5
Effective Green, g (s)	8.8	8.8	43.1		2.4	49.5
Actuated g/C Ratio	0.13	0.13	0.65		0.04	0.75
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)	235	210	2298		64	2642
v/s Ratio Prot	0.01		c0.37		c0.03	0.28
v/s Ratio Perm		c0.01				
v/c Ratio	0.05	0.08	0.57		0.84	0.37
Uniform Delay, d1	25.1	25.2	6.5		31.8	3.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.2	1.0		60.7	0.4
Delay (s)	25.2	25.4	7.5		92.4	3.4
Level of Service	C	C	A		F	A
Approach Delay (s)	25.4		7.5			8.0
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			8.7		HCM Level of Service	A
HCM Volume to Capacity ratio			0.50			
Actuated Cycle Length (s)			66.3		Sum of lost time (s)	12.0
Intersection Capacity Utilization			50.2%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
33: Road "M" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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)	10	10	50	10	10	10	120	10	10	10	10	10
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)	11	11	54	11	11	11	130	11	11	11	11	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	1190											
pX, platoon unblocked												
vC, conflicting volume	22			65			87	76	11	87	125	16
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	22			65			87	76	11	87	125	16
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 %	99			99			85	99	99	99	99	99
cM capacity (veh/h)	1594			1537			871	803	1070	871	755	1063
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1						
Volume Total	22	54	33	130	22	33						
Volume Left	11	0	11	130	0	11						
Volume Right	0	54	11	0	11	11						
cSH	1594	1700	1537	871	918	879						
Volume to Capacity	0.01	0.03	0.01	0.15	0.02	0.04						
Queue Length 95th (ft)	1	0	1	13	2	3						
Control Delay (s)	3.7	0.0	2.5	9.9	9.0	9.3						
Lane LOS	A		A	A	A	A						
Approach Delay (s)	1.0		2.5	9.7		9.3						
Approach LOS				A		A						
Intersection Summary												
Average Delay			6.6									
Intersection Capacity Utilization			28.3%		ICU Level of Service		A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
 34: Road "M" & Road "G"















Sutter Pointe EIR
 Cumulative Plus Project With PP AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘			↑	↓	↙
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	10	10	30	20	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	11	33	22	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	82	27	33			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	82	27	33			
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)	914	1048	1579			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	22	43	33			
Volume Left	11	11	0			
Volume Right	11	0	11			
cSH	977	1579	1700			
Volume to Capacity	0.02	0.01	0.02			
Queue Length 95th (ft)	2	1	0			
Control Delay (s)	8.8	1.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	1.9	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			18.8%	ICU Level of Service	A	
Analysis Period (min)			15			























HCM Signalized Intersection Capacity Analysis
35: Road "D" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	280	840	370	130	490	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	304	913	402	141	533	457
RTOR Reduction (vph)	0	450	0	100	0	0
Lane Group Flow (vph)	304	463	402	41	533	457
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	26.0	26.0	26.0	26.0	26.0	56.0
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	56.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.62
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)	511	457	1022	457	511	2202
v/s Ratio Prot	0.17		c0.11		c0.30	0.13
v/s Ratio Perm		c0.29		0.03		
v/c Ratio	0.59	1.01	0.39	0.09	1.04	0.21
Uniform Delay, d1	27.5	32.0	25.7	23.4	32.0	7.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	45.4	1.1	0.4	51.5	0.2
Delay (s)	29.3	77.4	26.8	23.7	83.5	7.6
Level of Service	C	E	C	C	F	A
Approach Delay (s)	65.4		26.0			48.5
Approach LOS	E		C			D
Intersection Summary						
HCM Average Control Delay			51.5		HCM Level of Service	D
HCM Volume to Capacity ratio			0.82			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			68.9%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
36: Road "D" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1857		1770	1863	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1857		1770	1863	1583	1770	1723		1770	1863	1583
Volume (vph)	130	490	10	10	830	60	10	10	10	90	10	290
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)	141	533	11	11	902	65	11	11	11	98	11	315
RTOR Reduction (vph)	0	1	0	0	0	30	0	10	0	0	0	209
Lane Group Flow (vph)	141	543	0	11	902	35	11	12	0	98	11	106
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases						6						8
Actuated Green, G (s)	6.3	38.9		0.6	33.2	33.2	0.6	6.1		4.7	10.2	10.2
Effective Green, g (s)	6.3	38.9		0.6	33.2	33.2	0.6	6.1		4.7	10.2	10.2
Actuated g/C Ratio	0.10	0.59		0.01	0.50	0.50	0.01	0.09		0.07	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	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
Lane Grp Cap (vph)	168	1090		16	933	793	16	159		125	287	244
v/s Ratio Prot	c0.08	0.29		0.01	c0.48		0.01	0.01		c0.06	0.01	
v/s Ratio Perm						0.02						c0.07
v/c Ratio	0.84	0.50		0.69	0.97	0.04	0.69	0.08		0.78	0.04	0.43
Uniform Delay, d1	29.5	8.0		32.8	16.0	8.4	32.8	27.5		30.3	23.9	25.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	29.1	0.4		80.1	21.5	0.0	80.1	0.2		26.7	0.1	1.2
Delay (s)	58.6	8.4		112.9	37.5	8.5	112.9	27.7		57.0	23.9	26.7
Level of Service	E	A		F	D	A	F	C		E	C	C
Approach Delay (s)		18.7			36.5			56.1			33.6	
Approach LOS		B			D			E			C	

Intersection Summary		
HCM Average Control Delay	30.5	HCM Level of Service C
HCM Volume to Capacity ratio	0.82	
Actuated Cycle Length (s)	66.3	Sum of lost time (s) 12.0
Intersection Capacity Utilization	75.0%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

HCM Unsignalized Intersection Capacity Analysis
 37: Road "J" & Road "A"

Sutter Pointe EIR
 Cumulative Plus Project With PP AM

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Stop			Stop	Stop	
Volume (vph)	80	200	350	70	130	130
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	217	380	76	141	141
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total (vph)	87	217	380	76	141	141
Volume Left (vph)	0	0	380	0	141	0
Volume Right (vph)	0	217	0	0	0	141
Hadj (s)	0.03	-0.67	0.53	0.03	0.53	-0.67
Departure Headway (s)	6.1	5.4	6.3	5.8	7.0	5.8
Degree Utilization, x	0.15	0.32	0.67	0.12	0.27	0.23
Capacity (veh/h)	563	644	558	595	484	578
Control Delay (s)	8.9	9.7	19.8	8.4	11.4	9.3
Approach Delay (s)	9.5		17.9		10.3	
Approach LOS	A		C		B	
Intersection Summary						
Delay			13.4			
HCM Level of Service			B			
Intersection Capacity Utilization			39.9%		ICU Level of Service	A
Analysis Period (min)			15			

























HCM Unsignalized Intersection Capacity Analysis
 38: Road "J" & Road "L"



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↗	↖	↖
Sign Control		Stop	Stop		Stop	
Volume (vph)	140	60	40	90	140	380
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	152	65	43	98	152	413
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total (vph)	152	65	43	98	152	413
Volume Left (vph)	152	0	0	0	152	0
Volume Right (vph)	0	0	0	98	0	413
Hadj (s)	0.53	0.03	0.03	-0.67	0.53	-0.67
Departure Headway (s)	6.7	6.2	6.3	5.6	6.1	4.9
Degree Utilization, x	0.28	0.11	0.08	0.15	0.26	0.56
Capacity (veh/h)	512	549	530	596	575	719
Control Delay (s)	11.1	8.7	8.6	8.4	9.9	12.6
Approach Delay (s)	10.4		8.5		11.9	
Approach LOS	B		A		B	
Intersection Summary						
Delay			11.0			
HCM Level of Service			B			
Intersection Capacity Utilization			33.5%		ICU Level of Service	A
Analysis Period (min)			15			
























HCM Signalized Intersection Capacity Analysis
39: Road "J" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project With PP AM

													
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	0.95	1.00	1.00	0.95		
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3531		
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3531		
Volume (vph)	50	120	70	90	80	100	40	1140	20	30	610	10	
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)	54	130	76	98	87	109	43	1239	22	33	663	11	
RTOR Reduction (vph)	0	0	67	0	0	93	0	0	9	0	1	0	
Lane Group Flow (vph)	54	130	9	98	87	16	43	1239	13	33	673	0	
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot			
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8			2				
Actuated Green, G (s)	7.5	14.1	14.1	9.9	16.5	16.5	26.4	47.7	47.7	26.4	47.7		
Effective Green, g (s)	7.5	14.1	14.1	9.9	16.5	16.5	26.4	47.7	47.7	26.4	47.7		
Actuated g/C Ratio	0.07	0.12	0.12	0.09	0.14	0.14	0.23	0.42	0.42	0.23	0.42		
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)	116	230	196	154	269	229	410	1479	662	410	1476		
v/s Ratio Prot	0.03	c0.07		c0.06	0.05		c0.02	c0.35		0.02	0.19		
v/s Ratio Perm			0.01			0.01			0.01				
v/c Ratio	0.47	0.57	0.05	0.64	0.32	0.07	0.10	0.84	0.02	0.08	0.46		
Uniform Delay, d1	51.4	47.1	44.1	50.4	43.8	42.2	34.5	29.7	19.5	34.3	23.9		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	2.9	3.2	0.1	8.3	0.7	0.1	0.5	5.8	0.1	0.4	1.0		
Delay (s)	54.3	50.3	44.2	58.7	44.5	42.3	35.1	35.6	19.5	34.7	24.9		
Level of Service	D	D	D	E	D	D	D	D	B	C	C		
Approach Delay (s)		49.3			48.4			35.3			25.4		
Approach LOS		D			D			D			C		
Intersection Summary													
HCM Average Control Delay			35.5									HCM Level of Service	D
HCM Volume to Capacity ratio			0.58										
Actuated Cycle Length (s)			114.1									Sum of lost time (s)	16.0
Intersection Capacity Utilization			51.6%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													















HCM Signalized Intersection Capacity Analysis
40: Road "J" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3528		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3528		1770	3539	1583
Volume (vph)	100	10	50	10	10	10	80	450	10	10	700	70
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)	109	11	54	11	11	11	87	489	11	11	761	76
RTOR Reduction (vph)	0	0	45	0	10	0	0	1	0	0	0	37
Lane Group Flow (vph)	109	11	9	11	12	0	87	499	0	11	761	39
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	6.7	10.3	10.3	0.7	4.3		4.5	37.0		0.7	33.2	33.2
Effective Green, g (s)	6.7	10.3	10.3	0.7	4.3		4.5	37.0		0.7	33.2	33.2
Actuated g/C Ratio	0.10	0.16	0.16	0.01	0.07		0.07	0.57		0.01	0.51	0.51
Clearance Time (s)	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
Lane Grp Cap (vph)	183	297	252	19	115		123	2018		19	1816	812
v/s Ratio Prot	c0.06	0.01		0.01	c0.01		c0.05	c0.14		0.01	c0.22	
v/s Ratio Perm			0.01									0.02
v/c Ratio	0.60	0.04	0.03	0.58	0.10		0.71	0.25		0.58	0.42	0.05
Uniform Delay, d1	27.7	23.0	23.0	31.9	28.4		29.5	6.9		31.9	9.8	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.1	0.1	0.1	36.3	0.4		16.9	0.1		36.3	0.2	0.0
Delay (s)	32.8	23.1	23.1	68.1	28.8		46.4	7.0		68.1	9.9	7.9
Level of Service	C	C	C	E	C		D	A		E	A	A
Approach Delay (s)		29.2			41.9			12.8			10.5	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM Average Control Delay			13.9				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			64.7				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			46.0%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
41: Road "G" & Road "A"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	160	20	330	50	20	740
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	22	359	54	22	804
RTOR Reduction (vph)	0	18	0	23	0	0
Lane Group Flow (vph)	174	4	359	31	22	804
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	10.5	10.5	31.8	31.8	0.9	36.7
Effective Green, g (s)	10.5	10.5	31.8	31.8	0.9	36.7
Actuated g/C Ratio	0.19	0.19	0.58	0.58	0.02	0.66
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)	337	301	2039	912	29	2353
v/s Ratio Prot	c0.10		0.10		0.01	c0.23
v/s Ratio Perm		0.00		0.02		
v/c Ratio	0.52	0.01	0.18	0.03	0.76	0.34
Uniform Delay, d1	20.1	18.1	5.5	5.1	27.0	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.0	0.2	0.1	71.7	0.4
Delay (s)	21.4	18.2	5.7	5.1	98.7	4.4
Level of Service	C	B	A	A	F	A
Approach Delay (s)	21.0		5.6			6.9
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			8.5		HCM Level of Service	A
HCM Volume to Capacity ratio			0.38			
Actuated Cycle Length (s)			55.2		Sum of lost time (s)	8.0
Intersection Capacity Utilization			36.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

























HCM Signalized Intersection Capacity Analysis
42: Road "G" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project With PP AM

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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.94		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1757		1770	1827		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1757		1770	1827		1770	3539	1583	1770	3539	1583
Volume (vph)	40	50	30	90	70	10	20	1150	30	10	710	20
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)	43	54	33	98	76	11	22	1250	33	11	772	22
RTOR Reduction (vph)	0	28	0	0	9	0	0	0	21	0	0	14
Lane Group Flow (vph)	43	59	0	98	78	0	22	1250	12	11	772	8
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases									2			6
Actuated Green, G (s)	1.4	7.3		5.0	10.9		4.1	18.6	18.6	4.1	18.6	18.6
Effective Green, g (s)	1.4	7.3		5.0	10.9		4.1	18.6	18.6	4.1	18.6	18.6
Actuated g/C Ratio	0.03	0.14		0.10	0.21		0.08	0.36	0.36	0.08	0.36	0.36
Clearance Time (s)	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
Lane Grp Cap (vph)	49	251		174	390		142	1291	577	142	1291	577
v/s Ratio Prot	0.02	0.03		c0.06	c0.04		c0.01	c0.35		0.01	0.22	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.88	0.23		0.56	0.20		0.15	0.97	0.02	0.08	0.60	0.01
Uniform Delay, d1	24.7	19.4		22.0	16.5		21.8	15.9	10.4	21.7	13.2	10.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	83.1	0.5		4.1	0.3		0.5	17.7	0.0	0.2	0.8	0.0
Delay (s)	107.8	19.9		26.1	16.7		22.3	33.7	10.4	21.9	13.9	10.4
Level of Service	F	B		C	B		C	C	B	C	B	B
Approach Delay (s)		49.0			21.7			32.9			13.9	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM Average Control Delay			26.6			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			51.0			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			50.1%			ICU Level of Service		A				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
43: Road "G" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.95		1.00	0.87		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1770		1770	1624		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1770		1770	1624		1770	3539	1583	1770	3539	1583
Volume (vph)	40	20	10	130	10	60	10	360	80	50	630	60
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)	43	22	11	141	11	65	11	391	87	54	685	65
RTOR Reduction (vph)	0	10	0	0	54	0	0	0	54	0	0	40
Lane Group Flow (vph)	43	23	0	141	22	0	11	391	33	54	685	25
Turn Type	Prot		Prot			Prot		Perm		Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	1.3	4.6		5.3	8.6		4.2	18.7	18.7	4.2	18.7	18.7
Effective Green, g (s)	1.3	4.6		5.3	8.6		4.2	18.7	18.7	4.2	18.7	18.7
Actuated g/C Ratio	0.03	0.09		0.11	0.18		0.09	0.38	0.38	0.09	0.38	0.38
Clearance Time (s)	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
Lane Grp Cap (vph)	47	167		192	286		152	1356	607	152	1356	607
v/s Ratio Prot	0.02	c0.01		c0.08	c0.01		0.01	0.11		c0.03	c0.19	
v/s Ratio Perm									0.02			0.02
v/c Ratio	0.91	0.14		0.73	0.08		0.07	0.29	0.05	0.36	0.51	0.04
Uniform Delay, d1	23.7	20.3		21.1	16.8		20.5	10.4	9.5	21.0	11.5	9.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	98.6	0.4		13.5	0.1		0.9	0.5	0.2	6.4	1.3	0.1
Delay (s)	122.3	20.7		34.6	16.9		21.4	11.0	9.7	27.4	12.9	9.6
Level of Service	F	C		C	B		C	B	A	C	B	A
Approach Delay (s)		78.2			28.4			11.0			13.6	
Approach LOS		E			C			B			B	
Intersection Summary												
HCM Average Control Delay			17.9			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			48.8			Sum of lost time (s)		20.0				
Intersection Capacity Utilization			44.6%			ICU Level of Service		A				
Analysis Period (min)			15									
c	Critical Lane Group											
























HCM Signalized Intersection Capacity Analysis
44: Road "G" & Road "D"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.93		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1631		1770	1723		1770	3533		1770	3530	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1631		1770	1723		1770	3533		1770	3530	
Volume (vph)	10	10	50	10	10	10	30	880	10	10	580	10
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)	11	11	54	11	11	11	33	957	11	11	630	11
RTOR Reduction (vph)	0	49	0	0	10	0	0	1	0	0	1	0
Lane Group Flow (vph)	11	16	0	11	12	0	33	967	0	11	640	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.8	6.9		0.8	6.9		0.8	45.2		0.8	45.2	
Effective Green, g (s)	0.8	6.9		0.8	6.9		0.8	45.2		0.8	45.2	
Actuated g/C Ratio	0.01	0.10		0.01	0.10		0.01	0.65		0.01	0.65	
Clearance Time (s)	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	
Lane Grp Cap (vph)	20	161		20	171		20	2291		20	2289	
v/s Ratio Prot	c0.01	c0.01		0.01	0.01		c0.02	c0.27		0.01	0.18	
v/s Ratio Perm												
v/c Ratio	0.55	0.10		0.55	0.07		1.65	0.42		0.55	0.28	
Uniform Delay, d1	34.3	28.6		34.3	28.5		34.5	5.9		34.3	5.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.9	0.3		28.9	0.2		443.3	0.1		28.9	0.1	
Delay (s)	63.2	28.9		63.2	28.7		477.7	6.1		63.2	5.3	
Level of Service	E	C		E	C		F	A		E	A	
Approach Delay (s)		33.8			40.2			21.6			6.3	
Approach LOS		C			D			C			A	
Intersection Summary												
HCM Average Control Delay			16.8				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			69.7				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			38.8%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
45: Riego Rd & Road "U"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3511		1770	3539	1583	1770	1863	1583	1770	1676	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3511		1770	3539	1583	1770	1863	1583	1770	1676	
Volume (vph)	40	180	10	380	480	380	10	10	130	130	10	20
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)	43	196	11	413	522	413	11	11	141	141	11	22
RTOR Reduction (vph)	0	5	0	0	0	278	0	0	117	0	20	0
Lane Group Flow (vph)	43	202	0	413	522	135	11	11	24	141	13	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6			4			
Actuated Green, G (s)	7.3	9.6		18.2	20.5	20.5	12.0	10.5	10.5	8.3	6.8	
Effective Green, g (s)	7.3	9.6		18.2	20.5	20.5	12.0	10.5	10.5	8.3	6.8	
Actuated g/C Ratio	0.12	0.15		0.29	0.33	0.33	0.19	0.17	0.17	0.13	0.11	
Clearance Time (s)	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	
Lane Grp Cap (vph)	206	538		515	1159	518	339	312	266	235	182	
v/s Ratio Prot	0.02	0.06		c0.23	c0.15		0.01	0.01		c0.08	0.01	
v/s Ratio Perm						0.09			c0.01			
v/c Ratio	0.21	0.38		0.80	0.45	0.26	0.03	0.04	0.09	0.60	0.07	
Uniform Delay, d1	25.0	23.8		20.5	16.6	15.5	20.6	21.8	22.0	25.6	25.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.4		8.8	0.3	0.3	0.0	0.0	0.1	4.1	0.2	
Delay (s)	25.5	24.2		29.3	16.9	15.8	20.6	21.9	22.2	29.7	25.2	
Level of Service	C	C		C	B	B	C	C	C	C	C	
Approach Delay (s)		24.5			20.3			22.0			28.8	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			21.8				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			62.6				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			50.2%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Pointe EIR
Cumulative Plus Project With PP AM
































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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1723		1770	1863	1583
Volume (vph)	50	420	10	10	1350	290	40	10	10	10	10	20
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)	54	457	11	11	1467	315	43	11	11	11	11	22
RTOR Reduction (vph)	0	0	5	0	0	109	0	9	0	0	0	20
Lane Group Flow (vph)	54	457	6	11	1467	206	43	13	0	11	11	2
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6						8
Actuated Green, G (s)	7.8	41.9	41.9	6.2	40.3	40.3	7.4	11.7		1.1	5.4	5.4
Effective Green, g (s)	7.8	41.9	41.9	6.2	40.3	40.3	7.4	11.7		1.1	5.4	5.4
Actuated g/C Ratio	0.10	0.54	0.54	0.08	0.52	0.52	0.10	0.15		0.01	0.07	0.07
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)	180	1928	863	143	1855	830	170	262		25	131	111
v/s Ratio Prot	c0.03	0.13		0.01	c0.41		c0.02	0.01		0.01	c0.01	
v/s Ratio Perm			0.00			0.13						0.00
v/c Ratio	0.30	0.24	0.01	0.08	0.79	0.25	0.25	0.05		0.44	0.08	0.01
Uniform Delay, d1	32.0	9.1	8.0	32.7	14.9	10.0	32.2	27.8		37.6	33.4	33.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1	0.0	0.2	2.4	0.2	0.8	0.1		11.9	0.3	0.1
Delay (s)	33.0	9.2	8.0	32.9	17.3	10.2	33.0	27.9		49.5	33.7	33.3
Level of Service	C	A	A	C	B	B	C	C		D	C	C
Approach Delay (s)		11.6			16.1			31.3			37.5	
Approach LOS		B			B			C			D	

Intersection Summary

HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	76.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	250	880	80	140	1510	110	150	170	60	110	200	490
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)	272	957	87	152	1641	120	163	185	65	120	217	533
RTOR Reduction (vph)	0	0	54	0	0	63	0	0	48	0	0	166
Lane Group Flow (vph)	272	957	33	152	1641	57	163	185	17	120	217	367
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	11.6	43.0	43.0	13.9	45.3	45.3	11.1	30.0	30.0	10.3	29.2	29.2
Effective Green, g (s)	11.6	43.0	43.0	13.9	45.3	45.3	11.1	30.0	30.0	10.3	29.2	29.2
Actuated g/C Ratio	0.10	0.38	0.38	0.12	0.40	0.40	0.10	0.27	0.27	0.09	0.26	0.26
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)	352	1932	601	217	2035	633	174	938	420	161	913	408
v/s Ratio Prot	0.08	0.19		c0.09	c0.32		c0.09	0.05		0.07	0.06	
v/s Ratio Perm			0.02			0.04			0.01			c0.23
v/c Ratio	0.77	0.50	0.05	0.70	0.81	0.09	0.94	0.20	0.04	0.75	0.24	0.90
Uniform Delay, d1	49.5	26.8	22.2	47.7	30.1	21.1	50.7	32.3	30.9	50.2	33.2	40.6
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	10.1	0.9	0.2	9.8	3.5	0.3	49.6	0.1	0.0	17.0	0.1	21.8
Delay (s)	59.6	27.7	22.4	57.4	33.6	21.4	100.3	32.4	31.0	67.2	33.3	62.4
Level of Service	E	C	C	E	C	C	F	C	C	E	C	E
Approach Delay (s)		34.0			34.7			59.0			55.8	
Approach LOS		C			C			E			E	
Intersection Summary												
HCM Average Control Delay			40.8				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			113.2				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			77.8%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"













Sutter Pointe EIR
Cumulative Plus Project With PP AM

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	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.97	0.95	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	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	260	420	120	220	1180	690	160	230	130	340	210	30
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)	283	457	130	239	1283	750	174	250	141	370	228	33
RTOR Reduction (vph)	0	0	79	0	0	310	0	0	119	0	0	26
Lane Group Flow (vph)	283	457	51	239	1283	440	174	250	22	370	228	7
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	14.1	39.3	39.3	11.1	36.3	36.3	13.5	15.4	15.4	18.2	20.1	20.1
Effective Green, g (s)	14.1	39.3	39.3	11.1	36.3	36.3	13.5	15.4	15.4	18.2	20.1	20.1
Actuated g/C Ratio	0.14	0.39	0.39	0.11	0.36	0.36	0.14	0.15	0.15	0.18	0.20	0.20
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)	250	1998	622	196	1846	575	239	545	244	625	711	318
v/s Ratio Prot	c0.16	c0.09		0.14	0.25		c0.10	c0.07		c0.11	0.06	
v/s Ratio Perm			0.03			c0.28			0.01			0.00
v/c Ratio	1.13	0.23	0.08	1.22	0.70	0.76	0.73	0.46	0.09	0.59	0.32	0.02
Uniform Delay, d1	43.0	20.2	19.0	44.5	27.1	28.1	41.5	38.5	36.3	37.5	34.1	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	97.2	0.3	0.3	135.8	2.2	9.4	10.5	0.6	0.2	4.1	0.3	0.0
Delay (s)	140.1	20.5	19.3	180.3	29.3	37.4	52.0	39.1	36.4	41.6	34.4	32.1
Level of Service	F	C	B	F	C	D	D	D	D	D	C	C
Approach Delay (s)		59.2			47.9			42.4			38.5	
Approach LOS		E			D			D			D	

Intersection Summary		
HCM Average Control Delay	48.1	HCM Level of Service D
HCM Volume to Capacity ratio	0.76	
Actuated Cycle Length (s)	100.0	Sum of lost time (s) 20.0
Intersection Capacity Utilization	73.5%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
53: Road "T" & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project With PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	220	10	50	370	20	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	11	54	402	22	174
RTOR Reduction (vph)	0	8	0	301	0	0
Lane Group Flow (vph)	239	3	54	101	22	174
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	8.4	8.4	9.1	9.1	6.7	19.8
Effective Green, g (s)	8.4	8.4	9.1	9.1	6.7	19.8
Actuated g/C Ratio	0.23	0.23	0.25	0.25	0.19	0.55
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)	411	367	468	398	328	1019
v/s Ratio Prot	c0.14		0.03		0.01	c0.09
v/s Ratio Perm		0.00		c0.06		
v/c Ratio	0.58	0.01	0.12	0.25	0.07	0.17
Uniform Delay, d1	12.3	10.7	10.4	10.8	12.2	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.0	0.1	0.3	0.1	0.1
Delay (s)	14.4	10.7	10.6	11.2	12.3	4.2
Level of Service	B	B	B	B	B	A
Approach Delay (s)	14.3		11.1			5.1
Approach LOS	B		B			A
Intersection Summary						
HCM Average Control Delay			10.7		HCM Level of Service	B
HCM Volume to Capacity ratio			0.36			
Actuated Cycle Length (s)			36.2		Sum of lost time (s)	12.0
Intersection Capacity Utilization			32.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
54: Road "T" & Road "U"

Sutter Pointe EIR
Cumulative Plus Project With PP AM















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	20	150	160	10	10	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	163	174	11	11	43
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	185				386	179
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	185				386	179
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	95
cM capacity (veh/h)	1390				608	863

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	22	163	185	11	43
Volume Left	22	0	0	11	0
Volume Right	0	0	11	0	43
cSH	1390	1700	1700	608	863
Volume to Capacity	0.02	0.10	0.11	0.02	0.05
Queue Length 95th (ft)	1	0	0	1	4
Control Delay (s)	7.6	0.0	0.0	11.0	9.4
Lane LOS	A			B	A
Approach Delay (s)	0.9		0.0	9.7	
Approach LOS				A	

Intersection Summary					
Average Delay			1.6		
Intersection Capacity Utilization		25.7%		ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
55: Road "Q" & Road "R"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	210	10	20	20	10	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	228	11	22	22	11	65
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	109	22			43	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	109	22			43	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	74	99			99	
cM capacity (veh/h)	882	1055			1565	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	228	11	22	22	11	65
Volume Left	228	0	0	0	11	0
Volume Right	0	11	0	22	0	0
cSH	882	1055	1700	1700	1565	1700
Volume to Capacity	0.26	0.01	0.01	0.01	0.01	0.04
Queue Length 95th (ft)	26	1	0	0	1	0
Control Delay (s)	10.5	8.4	0.0	0.0	7.3	0.0
Lane LOS	B	A			A	
Approach Delay (s)	10.4		0.0		1.0	
Approach LOS	B					
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			25.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
56: Road "T" & Road "R"
























Sutter Pointe EIR
Cumulative Plus Project With PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	30	40	50	10	40	230
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	43	54	11	43	250
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	65				163	54
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	65				163	54
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	75
cM capacity (veh/h)	1537				810	1013
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	33	43	54	11	43	250
Volume Left	33	0	0	0	43	0
Volume Right	0	0	0	11	0	250
cSH	1537	1700	1700	1700	810	1013
Volume to Capacity	0.02	0.03	0.03	0.01	0.05	0.25
Queue Length 95th (ft)	2	0	0	0	4	24
Control Delay (s)	7.4	0.0	0.0	0.0	9.7	9.7
Lane LOS	A				A	A
Approach Delay (s)	3.2		0.0		9.7	
Approach LOS					A	
Intersection Summary						
Average Delay			7.1			
Intersection Capacity Utilization			24.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
57: Road "Q" & Road "S"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1770		1770	1863	1583	1770	1863	1583	1770	1857	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1770		1770	1863	1583	1770	1863	1583	1770	1857	
Volume (vph)	10	20	10	430	260	60	20	260	40	10	470	10
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)	11	22	11	467	283	65	22	283	43	11	511	11
RTOR Reduction (vph)	0	10	0	0	0	40	0	0	28	0	1	0
Lane Group Flow (vph)	11	23	0	467	283	25	22	283	15	11	521	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	1.2	7.5		27.5	33.8	33.8	6.7	30.5	30.5	6.2	30.0	
Effective Green, g (s)	1.2	7.5		27.5	33.8	33.8	6.7	30.5	30.5	6.2	30.0	
Actuated g/C Ratio	0.01	0.09		0.31	0.39	0.39	0.08	0.35	0.35	0.07	0.34	
Clearance Time (s)	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	
Lane Grp Cap (vph)	24	151		555	718	610	135	648	551	125	635	
v/s Ratio Prot	0.01	0.01		c0.26	c0.15		c0.01	0.15		0.01	c0.28	
v/s Ratio Perm						0.02			0.01			
v/c Ratio	0.46	0.15		0.84	0.39	0.04	0.16	0.44	0.03	0.09	0.82	
Uniform Delay, d1	42.9	37.2		28.1	19.5	16.8	37.9	22.0	18.8	38.1	26.4	
Progression Factor	1.01	0.99		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.2	0.5		11.1	0.4	0.0	0.6	0.5	0.0	0.3	8.4	
Delay (s)	56.6	37.2		39.2	19.9	16.9	38.4	22.5	18.9	38.4	34.8	
Level of Service	E	D		D	B	B	D	C	B	D	C	
Approach Delay (s)		42.1			30.7			23.0			34.9	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM Average Control Delay			30.7									HCM Level of Service C
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			87.7									Sum of lost time (s) 12.0
Intersection Capacity Utilization			62.5%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
58: Road "B" North & Road "A"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3539	1583	1770	3539	1583
Volume (vph)	70	10	20	100	10	10	20	360	10	10	1110	150
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)	76	11	22	109	11	11	22	391	11	11	1207	163
RTOR Reduction (vph)	0	0	20	0	10	0	0	0	5	0	0	68
Lane Group Flow (vph)	76	11	2	109	12	0	22	391	6	11	1207	95
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	7.3	6.4	6.4	7.2	6.3		0.7	42.0	42.0	0.7	42.0	42.0
Effective Green, g (s)	7.3	6.4	6.4	7.2	6.3		0.7	42.0	42.0	0.7	42.0	42.0
Actuated g/C Ratio	0.10	0.09	0.09	0.10	0.09		0.01	0.58	0.58	0.01	0.58	0.58
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)	179	165	140	176	150		17	2056	920	17	2056	920
v/s Ratio Prot	0.04	0.01		c0.06	c0.01		c0.01	0.11		0.01	c0.34	
v/s Ratio Perm			0.00						0.00			0.06
v/c Ratio	0.42	0.07	0.01	0.62	0.08		1.29	0.19	0.01	0.65	0.59	0.10
Uniform Delay, d1	30.5	30.2	30.1	31.2	30.3		35.8	7.1	6.4	35.7	9.6	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.2	0.0	6.4	0.2		323.2	0.0	0.0	62.0	0.4	0.0
Delay (s)	32.1	30.4	30.1	37.6	30.6		359.0	7.2	6.4	97.7	10.1	6.8
Level of Service	C	C	C	D	C		F	A	A	F	B	A
Approach Delay (s)		31.6			36.4			25.4			10.4	
Approach LOS		C			D			C			B	
Intersection Summary												
HCM Average Control Delay			16.3			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			72.3			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			49.6%			ICU Level of Service		A				
Analysis Period (min)			15									
c Critical Lane Group												

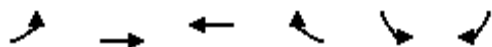
HCM Signalized Intersection Capacity Analysis
59: Road "B" South & Road "A"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

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	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	30	20	20	40	140	160	90	240	30	200	390	700
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)	33	22	22	43	152	174	98	261	33	217	424	761
RTOR Reduction (vph)	0	0	19	0	0	146	0	0	23	0	0	496
Lane Group Flow (vph)	33	22	3	43	152	28	98	261	10	217	424	265
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	3.8	12.7	12.7	4.8	13.7	13.7	26.5	26.5	26.5	26.5	26.5	26.5
Effective Green, g (s)	3.8	12.7	12.7	4.8	13.7	13.7	26.5	26.5	26.5	26.5	26.5	26.5
Actuated g/C Ratio	0.04	0.15	0.15	0.06	0.16	0.16	0.31	0.31	0.31	0.31	0.31	0.31
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)	151	274	232	98	295	251	542	1084	485	542	1084	485
v/s Ratio Prot	0.01	0.01		c0.02	c0.08		0.06	0.07		c0.12	0.12	
v/s Ratio Perm			0.00			0.02			0.01			c0.17
v/c Ratio	0.22	0.08	0.01	0.44	0.52	0.11	0.18	0.24	0.02	0.40	0.39	0.55
Uniform Delay, d1	39.9	31.9	31.5	39.5	33.4	31.2	22.0	22.5	20.9	23.7	23.6	25.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	0.0	3.1	1.5	0.2	0.7	0.5	0.1	2.2	1.1	4.4
Delay (s)	40.6	32.0	31.6	42.7	34.9	31.4	22.8	23.0	21.0	25.9	24.7	29.4
Level of Service	D	C	C	D	C	C	C	C	C	C	C	C
Approach Delay (s)		35.6			34.1			22.8			27.4	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM Average Control Delay			28.0				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			86.5				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			65.7%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
60: Road "B" North & Pacific Avenue
























Sutter Pointe EIR
Cumulative Plus Project With PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	10	70	10	30	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	76	11	33	33
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	76				114	82
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	76				114	82
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	97
cM capacity (veh/h)	1523				876	978
Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2	
Volume Total	11	11	87	33	33	
Volume Left	11	0	0	33	0	
Volume Right	0	0	11	0	33	
cSH	1523	1700	1700	876	978	
Volume to Capacity	0.01	0.01	0.05	0.04	0.03	
Queue Length 95th (ft)	1	0	0	3	3	
Control Delay (s)	7.4	0.0	0.0	9.3	8.8	
Lane LOS	A			A	A	
Approach Delay (s)	3.7		0.0	9.0		
Approach LOS				A		
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			17.2%		ICU Level of Service	A
Analysis Period (min)			15			
























HCM Signalized Intersection Capacity Analysis
61: Road "B" North & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3526		1770	3488	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3526		1770	3488	
Volume (vph)	10	10	30	10	10	10	20	390	10	10	370	40
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)	11	11	33	11	11	11	22	424	11	11	402	43
RTOR Reduction (vph)	0	0	31	0	10	0	0	1	0	0	5	0
Lane Group Flow (vph)	11	11	2	11	12	0	22	434	0	11	440	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.9	4.9	4.9	0.9	4.9		0.9	52.5		0.9	52.5	
Effective Green, g (s)	0.9	4.9	4.9	0.9	4.9		0.9	52.5		0.9	52.5	
Actuated g/C Ratio	0.01	0.07	0.07	0.01	0.07		0.01	0.70		0.01	0.70	
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)	21	121	103	21	112		21	2462		21	2435	
v/s Ratio Prot	c0.01	0.01		0.01	c0.01		c0.01	0.12		0.01	c0.13	
v/s Ratio Perm			0.00									
v/c Ratio	0.52	0.09	0.02	0.52	0.10		1.05	0.18		0.52	0.18	
Uniform Delay, d1	36.9	33.1	32.9	36.9	33.1		37.1	3.9		36.9	3.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.6	0.3	0.1	21.6	0.4		212.0	0.0		21.6	0.0	
Delay (s)	58.5	33.4	33.0	58.5	33.5		249.2	3.9		58.5	4.0	
Level of Service	E	C	C	E	C		F	A		E	A	
Approach Delay (s)		38.2			41.8			15.7			5.3	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM Average Control Delay			13.1				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.19									
Actuated Cycle Length (s)			75.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			30.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
62: Road "B" South & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1793		1770	1863	1583	1770	3274		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1793		1770	1863	1583	1770	3274		1770	3539	1583
Volume (vph)	230	30	10	10	100	190	10	10	10	100	10	320
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)	250	33	11	11	109	207	11	11	11	109	11	348
RTOR Reduction (vph)	0	7	0	0	0	167	0	8	0	0	0	237
Lane Group Flow (vph)	250	37	0	11	109	40	11	14	0	109	11	111
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases						8						6
Actuated Green, G (s)	11.6	22.2		0.6	11.2	11.2	0.6	13.9		5.2	18.5	18.5
Effective Green, g (s)	11.6	22.2		0.6	11.2	11.2	0.6	13.9		5.2	18.5	18.5
Actuated g/C Ratio	0.20	0.38		0.01	0.19	0.19	0.01	0.24		0.09	0.32	0.32
Clearance Time (s)	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
Lane Grp Cap (vph)	355	687		18	360	306	18	786		159	1131	506
v/s Ratio Prot	c0.14	0.02		0.01	c0.06		0.01	0.00		c0.06	0.00	
v/s Ratio Perm						0.03						c0.07
v/c Ratio	0.70	0.05		0.61	0.30	0.13	0.61	0.02		0.69	0.01	0.22
Uniform Delay, d1	21.6	11.2		28.5	20.0	19.3	28.5	16.8		25.6	13.4	14.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.2	0.0		48.7	0.5	0.2	48.7	0.0		11.6	0.0	0.2
Delay (s)	27.8	11.3		77.2	20.5	19.5	77.2	16.8		37.1	13.5	14.6
Level of Service	C	B		E	C	B	E	B		D	B	B
Approach Delay (s)		25.3			21.8			36.9			19.9	
Approach LOS		C			C			D			B	
Intersection Summary												
HCM Average Control Delay			22.3				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			57.9				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			38.4%				ICU Level of Service				A	
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
63: Road "B" North & Road "D"













Sutter Pointe EIR
Cumulative Plus Project With PP AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	10	30	400	310	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	11	33	435	337	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	33				65	33
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	33				65	33
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				64	99
cM capacity (veh/h)	1579				934	1041
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	11	11	33	435	337	11
Volume Left	11	0	0	0	337	0
Volume Right	0	0	0	435	0	11
cSH	1579	1700	1700	1700	934	1041
Volume to Capacity	0.01	0.01	0.02	0.26	0.36	0.01
Queue Length 95th (ft)	1	0	0	0	41	1
Control Delay (s)	7.3	0.0	0.0	0.0	11.0	8.5
Lane LOS	A				B	A
Approach Delay (s)	3.6		0.0		10.9	
Approach LOS					B	
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			34.8%		ICU Level of Service	A
Analysis Period (min)			15			













HCM Signalized Intersection Capacity Analysis
64: Elverta Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP AM

													
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	
Lane Util. Factor		0.95	1.00		1.00	1.00				1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		3539	1583		1863	1583				1770		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		3539	1583		1863	1583				1770		1583	
Volume (vph)	0	170	110	0	630	610	0	0	0	130	0	270	
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	185	120	0	685	663	0	0	0	141	0	293	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	182	
Lane Group Flow (vph)	0	185	120	0	685	663	0	0	0	141	0	111	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		35.6	53.8		35.6	53.8				10.2		10.2	
Effective Green, g (s)		35.6	53.8		35.6	53.8				10.2		10.2	
Actuated g/C Ratio		0.66	1.00		0.66	1.00				0.19		0.19	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2342	1583		1233	1583				336		300	
v/s Ratio Prot		0.05			c0.37					0.08			
v/s Ratio Perm			0.08			c0.42						0.07	
v/c Ratio		0.08	0.08		0.56	0.42				0.42		0.37	
Uniform Delay, d1		3.2	0.0		4.9	0.0				19.2		19.0	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.1		1.8	0.8				0.8		0.8	
Delay (s)		3.3	0.1		6.7	0.8				20.0		19.8	
Level of Service		A	A		A	A				C		B	
Approach Delay (s)		2.0			3.8			0.0			19.9		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			6.9									HCM Level of Service	A
HCM Volume to Capacity ratio			0.52										
Actuated Cycle Length (s)			53.8									Sum of lost time (s)	4.0
Intersection Capacity Utilization			56.5%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
65: Elverta Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP AM

												
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	1.00		0.95	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		3539	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		3539	1583	1770		1583			
Volume (vph)	0	200	100	0	860	320	380	0	190	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)	0	217	109	0	935	348	413	0	207	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	217	109	0	935	348	413	0	207	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		23.6	46.5		23.6	46.5	14.9		46.5			
Effective Green, g (s)		23.6	46.5		23.6	46.5	14.9		46.5			
Actuated g/C Ratio		0.51	1.00		0.51	1.00	0.32		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		946	1583		1796	1583	567		1583			
v/s Ratio Prot		0.12			c0.26		c0.23					
v/s Ratio Perm			0.07			0.22			0.13			
v/c Ratio		0.23	0.07		0.52	0.22	0.73		0.13			
Uniform Delay, d1		6.4	0.0		7.7	0.0	14.0		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.6	0.1		0.3	0.3	4.7		0.2			
Delay (s)		6.9	0.1		7.9	0.3	18.7		0.2			
Level of Service		A	A		A	A	B		A			
Approach Delay (s)		4.7			5.9			12.5			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay			7.5				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			46.5				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			51.5%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 1: Sankey Rd & Power Line Rd





















Sutter Pointe EIR
 Cumulative Plus Project With PP PM



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	10	10	10	10	10	20	10	10	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	10	10	10	21	10	10	10	10	10
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	108	98	15	108	98	15	21			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	108	98	15	108	98	15	21			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	99	99	99	99			99		
cM capacity (veh/h)	841	777	1064	841	777	1064	1595			1595		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	31	31	41	31								
Volume Left	10	10	21	10								
Volume Right	10	10	10	10								
cSH	878	878	1595	1595								
Volume to Capacity	0.04	0.04	0.01	0.01								
Queue Length 95th (ft)	3	3	1	0								
Control Delay (s)	9.2	9.2	3.7	2.5								
Lane LOS	A	A	A	A								
Approach Delay (s)	9.2	9.2	3.7	2.5								
Approach LOS	A	A										
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			13.5%		ICU Level of Service					A		
Analysis Period (min)			15									

































HCM Signalized Intersection Capacity Analysis
4: Riego Rd & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.86		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1846		1770	1845		1770	1593		1770	1723	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1846		1770	1845		1770	1593		1770	1723	
Volume (vph)	10	150	10	230	300	20	50	10	270	10	10	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	155	10	237	309	21	52	10	278	10	10	10
RTOR Reduction (vph)	0	4	0	0	4	0	0	216	0	0	8	0
Lane Group Flow (vph)	10	161	0	237	326	0	52	72	0	10	12	0
Turn Type	Prot		Prot		Prot		Prot		Prot			
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.5	10.2		8.5	18.2		1.2	10.2		0.5	9.5	
Effective Green, g (s)	0.5	10.2		8.5	18.2		1.2	10.2		0.5	9.5	
Actuated g/C Ratio	0.01	0.22		0.19	0.40		0.03	0.22		0.01	0.21	
Clearance Time (s)	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	
Lane Grp Cap (vph)	19	415		331	740		47	358		19	361	
v/s Ratio Prot	0.01	0.09		c0.13	c0.18		c0.03	c0.05		0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.53	0.39		0.72	0.44		1.11	0.20		0.53	0.03	
Uniform Delay, d1	22.3	14.9		17.3	9.9		22.1	14.3		22.3	14.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.9	0.6		7.2	0.4		164.1	0.3		23.9	0.0	
Delay (s)	46.2	15.6		24.5	10.3		186.2	14.6		46.2	14.3	
Level of Service	D	B		C	B		F	B		D	B	
Approach Delay (s)		17.3			16.3			40.8			25.0	
Approach LOS		B			B			D			C	
Intersection Summary												
HCM Average Control Delay			24.2	HCM Level of Service				C				
HCM Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			45.4	Sum of lost time (s)				8.0				
Intersection Capacity Utilization			48.5%	ICU Level of Service				A				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: Riego Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project With PP PM

























												
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	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	1770	3343	1583	1770	3223	1583
Volume (vph)	1180	1370	1730	1990	1000	340	930	2340	1840	220	1870	570
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1216	1412	1784	2052	1031	351	959	2412	1897	227	1928	588
RTOR Reduction (vph)	0	0	216	0	0	76	0	0	0	0	0	0
Lane Group Flow (vph)	1216	1412	1568	2052	1031	275	959	2412	1897	227	1928	588
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	8%	2%	2%	12%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			Free			Free
Actuated Green, G (s)	20.0	45.0	45.0	32.0	57.0	57.0	29.0	58.0	160.0	9.0	38.0	160.0
Effective Green, g (s)	20.0	45.0	45.0	32.0	57.0	57.0	29.0	58.0	160.0	9.0	38.0	160.0
Actuated g/C Ratio	0.12	0.28	0.28	0.20	0.36	0.36	0.18	0.36	1.00	0.06	0.24	1.00
Clearance Time (s)	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	
Lane Grp Cap (vph)	429	1430	445	687	1812	564	321	1212	1583	100	765	1583
v/s Ratio Prot	0.35	0.28		c0.60	0.20		c0.54	0.72		0.13	c0.60	
v/s Ratio Perm			c0.99			0.17			1.20			0.37
v/c Ratio	2.83	0.99	3.52	2.99	0.57	0.49	2.99	1.99	1.20	2.27	2.52	0.37
Uniform Delay, d1	70.0	57.2	57.5	64.0	41.6	40.1	65.5	51.0	80.0	75.5	61.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	832.0	20.6	1141.6	898.0	0.4	0.7	902.7	448.5	95.7	602.0	688.0	0.7
Delay (s)	902.0	77.8	1199.1	962.0	42.0	40.8	968.2	499.5	175.7	677.5	749.0	0.7
Level of Service	F	E	F	F	D	D	F	F	F	F	F	A
Approach Delay (s)		758.4			591.6			468.2			582.7	
Approach LOS		F			F			F			F	

Intersection Summary		
HCM Average Control Delay	595.5	HCM Level of Service F
HCM Volume to Capacity ratio	3.03	
Actuated Cycle Length (s)	160.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	225.6%	ICU Level of Service H
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Riego Rd & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project With PP PM













												
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	0.97	0.86	1.00	0.97	0.86	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	3433	6408	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	610	1920	70	100	1560	330	40	130	370	270	50	830
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	629	1979	72	103	1608	340	41	134	381	278	52	856
RTOR Reduction (vph)	0	0	38	0	0	221	0	0	102	0	0	219
Lane Group Flow (vph)	629	1979	34	103	1608	119	41	134	279	278	52	637
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			6			4			8
Actuated Green, G (s)	23.0	52.3	52.3	7.7	37.0	37.0	3.2	35.2	35.2	18.0	50.0	50.0
Effective Green, g (s)	23.0	52.3	52.3	7.7	37.0	37.0	3.2	35.2	35.2	18.0	50.0	50.0
Actuated g/C Ratio	0.18	0.40	0.40	0.06	0.29	0.29	0.02	0.27	0.27	0.14	0.39	0.39
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)	611	2594	641	205	1835	453	85	964	431	478	1370	613
v/s Ratio Prot	c0.18	0.31		0.03	c0.25		0.01	0.04		c0.08	0.01	
v/s Ratio Perm			0.02			0.08			0.18			c0.40
v/c Ratio	1.03	0.76	0.05	0.50	0.88	0.26	0.48	0.14	0.65	0.58	0.04	1.04
Uniform Delay, d1	53.1	33.1	23.4	58.9	43.9	35.6	62.2	35.5	41.5	52.1	24.6	39.6
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	44.2	2.2	0.2	1.9	6.2	1.4	4.3	0.1	3.3	5.1	0.1	46.7
Delay (s)	97.3	35.3	23.5	60.8	50.2	37.0	66.4	35.6	44.9	57.2	24.7	86.3
Level of Service	F	D	C	E	D	D	E	D	D	E	C	F
Approach Delay (s)		49.5			48.5			44.2			76.8	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	53.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	129.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
7: Riego Rd & Natomas Rd

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	2150	100	0	1500	0	0	0	30	0	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	2216	103	0	1546	0	0	0	31	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)												
pX, platoon unblocked												
vC, conflicting volume	1546			2320			2732	3763	739	2316	3866	515
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1546			2320			2732	3763	739	2316	3866	515
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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			100			100	100	91	100	100	100
cM capacity (veh/h)	425			212			10	4	360	18	3	504
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	NB 1				
Volume Total	739	739	739	103	515	515	515	31				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	0	103	0	0	0	31				
cSH	1700	1700	1700	1700	1700	1700	1700	360				
Volume to Capacity	0.43	0.43	0.43	0.06	0.30	0.30	0.30	0.09				
Queue Length 95th (ft)	0	0	0	0	0	0	0	7				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9				
Lane LOS								C				
Approach Delay (s)	0.0				0.0			15.9				
Approach LOS								C				
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization		51.5%		ICU Level of Service	A							
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)











Sutter Pointe EIR
 Cumulative Plus Project With PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	↘
Sign Control		Stop	Stop		Stop	
Volume (vph)	110	2070	1450	140	50	50
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	113	2134	1495	144	52	52
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total (vph)	2247	1495	144	103		
Volume Left (vph)	113	0	0	52		
Volume Right (vph)	0	0	144	52		
Hadj (s)	0.04	0.03	-0.67	-0.17		
Departure Headway (s)	5.3	5.5	4.8	6.8		
Degree Utilization, x	3.29	2.30	0.19	0.19		
Capacity (veh/h)	687	664	736	522		
Control Delay (s)	1047.0	600.3	7.8	11.4		
Approach Delay (s)	1047.0	548.2		11.4		
Approach LOS	F	F		B		
Intersection Summary						
Delay			815.3			
HCM Level of Service			F			
Intersection Capacity Utilization			207.2%		ICU Level of Service	H
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Cumulative Plus Project With PP PM

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	1410	710	60	960	630	60
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	1454	732	62	990	649	62
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total (vph)	1454	732	1052	711		
Volume Left (vph)	0	0	62	649		
Volume Right (vph)	0	732	0	62		
Hadj (s)	0.03	-0.67	0.05	0.16		
Departure Headway (s)	7.6	6.9	7.1	7.1		
Degree Utilization, x	3.08	1.41	2.08	1.41		
Capacity (veh/h)	476	534	513	517		
Control Delay (s)	954.6	213.2	510.7	217.7		
Approach Delay (s)	706.3		510.7	217.7		
Approach LOS	F		F	F		
Intersection Summary						
Delay			566.2			
HCM Level of Service			F			
Intersection Capacity Utilization			144.9%	ICU Level of Service	H	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	1320	140	40	930	40	80	10	190	90	20	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	1361	144	41	959	41	82	10	196	93	21	10
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	1515	1041	289	124								
Volume Left (vph)	10	41	82	93								
Volume Right (vph)	144	41	196	10								
Hadj (s)	-0.02	0.02	-0.32	0.13								
Departure Headway (s)	6.8	6.8	7.4	8.7								
Degree Utilization, x	2.86	1.97	0.60	0.30								
Capacity (veh/h)	541	536	469	395								
Control Delay (s)	854.9	461.2	20.8	15.3								
Approach Delay (s)	854.9	461.2	20.8	15.3								
Approach LOS	F	F	C	C								
Intersection Summary												
Delay			600.8									
HCM Level of Service			F									
Intersection Capacity Utilization			104.5%	ICU Level of Service	G							
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd





































Sutter Pointe EIR
 Cumulative Plus Project With PP PM

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	0.91	1.00	1.00	0.91	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	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	1330	120	230	870	110	80	50	290	70	70	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	1371	124	237	897	113	82	52	299	72	72	10
RTOR Reduction (vph)	0	0	61	0	0	51	0	0	269	0	0	9
Lane Group Flow (vph)	10	1371	63	237	897	62	82	52	30	72	72	1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	0.7	52.4	52.4	20.8	72.5	72.5	31.3	13.3	13.3	29.2	11.2	11.2
Effective Green, g (s)	0.7	52.4	52.4	20.8	72.5	72.5	31.3	13.3	13.3	29.2	11.2	11.2
Actuated g/C Ratio	0.01	0.40	0.40	0.16	0.55	0.55	0.24	0.10	0.10	0.22	0.09	0.09
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)	9	2023	630	280	2799	871	421	188	160	392	158	135
v/s Ratio Prot	0.01	c0.27		c0.13	0.18		c0.05	0.03		0.04	c0.04	
v/s Ratio Perm			0.04			0.04			0.02			0.00
v/c Ratio	1.11	0.68	0.10	0.85	0.32	0.07	0.19	0.28	0.19	0.18	0.46	0.01
Uniform Delay, d1	65.5	32.7	24.9	53.9	16.2	13.8	40.1	54.8	54.3	41.6	57.3	55.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	342.2	0.9	0.1	20.4	0.3	0.2	1.0	0.8	0.6	1.0	2.1	0.0
Delay (s)	407.7	33.6	24.9	74.3	16.5	14.0	41.2	55.6	54.8	42.6	59.4	55.2
Level of Service	F	C	C	E	B	B	D	E	D	D	E	E
Approach Delay (s)		35.4			27.2			52.3			51.3	
Approach LOS		D			C			D			D	

Intersection Summary		
HCM Average Control Delay	35.3	HCM Level of Service D
HCM Volume to Capacity ratio	0.56	
Actuated Cycle Length (s)	131.7	Sum of lost time (s) 16.0
Intersection Capacity Utilization	59.5%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		






























HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	1010	1630	170	700	1390	20	170	920	660	20	990	880
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1041	1680	175	722	1433	21	175	948	680	21	1021	907
RTOR Reduction (vph)	0	0	43	0	0	11	0	0	294	0	0	361
Lane Group Flow (vph)	1041	1680	132	722	1433	10	175	948	386	21	1021	546
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	41.0	49.4	49.4	30.0	38.0	38.0	6.0	46.9	46.9	2.4	43.3	43.3
Effective Green, g (s)	41.0	51.4	51.4	29.6	40.0	40.0	6.0	47.2	47.2	2.4	43.6	43.6
Actuated g/C Ratio	0.28	0.35	0.35	0.20	0.27	0.27	0.04	0.32	0.32	0.02	0.30	0.30
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.3
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	1.0
Lane Grp Cap (vph)	960	1783	555	693	1387	432	141	1637	510	56	1512	471
v/s Ratio Prot	c0.30	0.33		0.21	c0.28		c0.05	0.19		0.01	0.20	
v/s Ratio Perm			0.08			0.01			c0.24			c0.34
v/c Ratio	1.08	0.94	0.24	1.04	1.03	0.02	1.24	0.58	0.76	0.38	0.68	1.16
Uniform Delay, d1	52.8	46.2	33.7	58.5	53.3	39.0	70.3	41.4	44.5	71.4	45.3	51.5
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	54.7	10.5	0.1	45.6	33.1	0.0	154.6	0.3	5.6	4.2	0.9	93.0
Delay (s)	107.5	56.6	33.8	104.1	86.4	39.0	224.9	41.7	50.2	75.5	46.2	144.5
Level of Service	F	E	C	F	F	D	F	D	D	E	D	F
Approach Delay (s)		73.5			91.8			62.7			92.3	
Approach LOS		E			F			E			F	
Intersection Summary												
HCM Average Control Delay			80.0	HCM Level of Service				E				
HCM Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			146.6	Sum of lost time (s)				20.0				
Intersection Capacity Utilization			96.2%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	620	1220	70	250	1000	500	30	1050	280	440	1220	460
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	639	1258	72	258	1031	515	31	1082	289	454	1258	474
RTOR Reduction (vph)	0	0	49	0	0	151	0	0	159	0	0	220
Lane Group Flow (vph)	639	1258	23	258	1031	364	31	1082	130	454	1258	254
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	23.0	39.0	39.0	13.0	29.0	29.0	1.8	38.6	38.6	16.0	52.8	52.8
Effective Green, g (s)	23.0	41.0	41.0	13.0	31.0	31.0	1.8	40.6	40.6	16.0	54.8	54.8
Actuated g/C Ratio	0.18	0.32	0.32	0.10	0.24	0.24	0.01	0.32	0.32	0.13	0.43	0.43
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	4.8
Lane Grp Cap (vph)	624	1647	513	353	1245	388	49	1135	508	434	1532	685
v/s Ratio Prot	c0.19	0.25		0.08	0.20		0.01	c0.31		c0.13	0.36	
v/s Ratio Perm			0.01			c0.23			0.08			0.16
v/c Ratio	1.02	0.76	0.05	0.73	0.83	0.94	0.63	0.95	0.26	1.05	0.82	0.37
Uniform Delay, d1	51.8	38.5	29.4	55.1	45.3	46.9	62.1	42.1	31.8	55.3	31.6	24.3
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	42.3	2.5	0.1	6.6	5.2	30.8	17.9	17.0	0.5	55.8	4.1	0.7
Delay (s)	94.1	41.0	29.4	61.7	50.5	77.7	80.0	59.0	32.3	111.1	35.7	24.9
Level of Service	F	D	C	E	D	E	E	E	C	F	D	C
Approach Delay (s)		57.8			59.8			54.0			49.0	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM Average Control Delay			55.0			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			126.6			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			91.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

















HCM Unsignalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	50	10	30	10	500	20	80	10	560	40	90
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	52	10	31	10	515	21	82	10	577	41	93
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	82	557	113	711								
Volume Left (vph)	21	31	21	577								
Volume Right (vph)	10	515	10	93								
Hadj (s)	0.01	-0.51	0.02	0.12								
Departure Headway (s)	7.4	5.8	7.2	6.3								
Degree Utilization, x	0.17	0.90	0.23	1.25								
Capacity (veh/h)	459	614	472	564								
Control Delay (s)	11.9	39.0	12.3	145.6								
Approach Delay (s)	11.9	39.0	12.3	145.6								
Approach LOS	B	E	B	F								
Intersection Summary												
Delay			87.2									
HCM Level of Service			F									
Intersection Capacity Utilization			86.7%	ICU Level of Service	E							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP PM

												
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	950	10	0	390	420	0	0	660	0	0	130
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	979	10	0	402	433	0	0	680	0	0	134
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.57						0.57	0.57		0.57	0.57	0.57
vC, conflicting volume	835			990			1737	1820	985	2284	1608	619
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	709			990			2301	2446	985	3265	2073	327
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			100			100	100	0	0	100	67
cM capacity (veh/h)	504			698			10	18	301	0	31	405
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	990	835	680	134								
Volume Left	0	0	0	0								
Volume Right	10	433	680	134								
cSH	1700	1700	301	405								
Volume to Capacity	0.58	0.49	2.26	0.33								
Queue Length 95th (ft)	0	0	1307	36								
Control Delay (s)	0.0	0.0	604.1	18.2								
Lane LOS			F	C								
Approach Delay (s)	0.0	0.0	604.1	18.2								
Approach LOS			F	C								
Intersection Summary												
Average Delay			156.7									
Intersection Capacity Utilization			98.1%		ICU Level of Service				F			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd



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	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	1.00	
Flt Protected	0.95	1.00	1.00	1.00	0.95	
Satd. Flow (prot)	1770	3539	1863	1583	1769	
Flt Permitted	0.95	1.00	1.00	1.00	0.95	
Satd. Flow (perm)	1770	3539	1863	1583	1769	
Volume (vph)	160	1450	800	60	310	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	165	1495	825	62	320	10
RTOR Reduction (vph)	0	0	0	32	2	0
Lane Group Flow (vph)	165	1495	825	30	328	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		4	
Permitted Phases				6		
Actuated Green, G (s)	8.9	47.7	34.8	34.8	16.1	
Effective Green, g (s)	8.9	47.7	34.8	34.8	16.1	
Actuated g/C Ratio	0.12	0.66	0.48	0.48	0.22	
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)	219	2351	903	767	397	
v/s Ratio Prot	c0.09	0.42	c0.44		c0.19	
v/s Ratio Perm				0.02		
v/c Ratio	0.75	0.64	0.91	0.04	0.83	
Uniform Delay, d1	30.4	7.0	17.1	9.7	26.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.6	0.6	13.4	0.0	13.2	
Delay (s)	44.0	7.6	30.5	9.7	39.7	
Level of Service	D	A	C	A	D	
Approach Delay (s)		11.2	29.1		39.7	
Approach LOS		B	C		D	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: Elverta Rd & Palladay Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP PM


































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	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)	320	1590	1020	300	210	300
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	1639	1052	309	216	309
RTOR Reduction (vph)	0	0	0	204	0	223
Lane Group Flow (vph)	330	1639	1052	105	216	86
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	19.9	52.1	28.2	28.2	23.1	23.1
Effective Green, g (s)	19.9	52.1	28.2	28.2	23.1	23.1
Actuated g/C Ratio	0.24	0.63	0.34	0.34	0.28	0.28
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)	423	2216	1200	537	491	440
v/s Ratio Prot	0.19	c0.46	c0.30		c0.12	
v/s Ratio Perm				0.07		0.05
v/c Ratio	0.78	0.74	0.88	0.20	0.44	0.19
Uniform Delay, d1	29.6	10.8	25.9	19.5	24.7	22.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.0	1.3	9.2	0.8	2.8	1.0
Delay (s)	38.6	12.2	35.0	20.3	27.6	23.9
Level of Service	D	B	D	C	C	C
Approach Delay (s)		16.6	31.7		25.4	
Approach LOS		B	C		C	

Intersection Summary

HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			
























HCM Signalized Intersection Capacity Analysis
19: Elverta Rd & 16th St

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	290	1030	350	160	720	200	310	660	280	390	560	340
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	299	1062	361	165	742	206	320	680	289	402	577	351
RTOR Reduction (vph)	0	0	227	0	0	147	0	0	93	0	0	105
Lane Group Flow (vph)	299	1062	134	165	742	59	320	680	196	402	577	246
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	5	2			1	6			7	4		
Permitted Phases			2				6				8	
Actuated Green, G (s)	8.0	27.0	27.0	4.0	23.0	23.0	9.9	23.0	23.0	10.0	23.1	23.1
Effective Green, g (s)	8.0	27.0	27.0	4.0	23.0	23.0	9.9	23.0	23.0	10.0	23.1	23.1
Actuated g/C Ratio	0.10	0.34	0.34	0.05	0.29	0.29	0.12	0.29	0.29	0.12	0.29	0.29
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)	343	1194	534	172	1017	455	425	1017	455	429	1022	457
v/s Ratio Prot	c0.09	c0.30			0.05	0.21			0.09	c0.19		
v/s Ratio Perm			0.08				0.04				0.16	
v/c Ratio	0.87	0.89	0.25	0.96	0.73	0.13	0.75	0.67	0.43	0.94	0.56	0.54
Uniform Delay, d1	35.5	25.1	19.2	37.9	25.7	21.1	33.9	25.1	23.2	34.7	24.2	24.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.8	10.1	1.1	56.0	4.6	0.6	7.4	3.5	3.0	27.9	2.3	4.5
Delay (s)	56.3	35.2	20.3	93.9	30.3	21.7	41.3	28.6	26.1	62.6	26.4	28.4
Level of Service	E	D	C	F	C	C	D	C	C	E	C	C
Approach Delay (s)	35.7				38.1				31.2		37.9	
Approach LOS	D				D				C		D	
Intersection Summary												
HCM Average Control Delay	35.7		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	75.7%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project With PP PM













												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	720	790	720	280	390	230	710	1230	380	330	1120	690
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	742	814	742	289	402	237	732	1268	392	340	1155	711
RTOR Reduction (vph)	0	0	240	0	0	174	0	0	141	0	0	277
Lane Group Flow (vph)	742	814	502	289	402	63	732	1268	251	340	1155	434
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	28.5	47.5	47.5	11.7	31.0	31.0	28.5	47.9	47.9	15.5	34.9	34.9
Effective Green, g (s)	30.0	49.2	49.2	13.2	32.4	32.4	30.0	49.6	49.6	17.0	36.6	36.6
Actuated g/C Ratio	0.21	0.34	0.34	0.09	0.22	0.22	0.21	0.34	0.34	0.12	0.25	0.25
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.7
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	5.4
Lane Grp Cap (vph)	710	1725	537	313	1136	354	710	1739	541	402	1284	400
v/s Ratio Prot	c0.22	0.16		0.08	0.08		c0.21	0.25		0.10	0.23	
v/s Ratio Perm			c0.32			0.04			0.16			c0.27
v/c Ratio	1.05	0.47	0.93	0.92	0.35	0.18	1.03	0.73	0.46	0.85	0.90	1.09
Uniform Delay, d1	57.5	37.7	46.3	65.4	47.5	45.5	57.5	41.8	37.3	62.7	52.4	54.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	46.1	0.6	24.7	31.2	0.4	0.5	42.0	2.0	1.5	14.5	9.4	70.1
Delay (s)	103.6	38.2	71.0	96.5	47.9	46.0	99.5	43.8	38.8	77.2	61.8	124.3
Level of Service	F	D	E	F	D	D	F	D	D	E	E	F
Approach Delay (s)		69.9			62.6			60.0			84.3	
Approach LOS		E			E			E			F	

Intersection Summary

HCM Average Control Delay	70.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			













HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Cumulative Plus Project With PP PM

													
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	
Lane Util. Factor		0.91	1.00		0.95	1.00				0.97		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		5085	1583		3539	1583				3433		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		5085	1583		3539	1583				3433		1583	
Volume (vph)	0	820	110	0	390	370	0	0	0	790	0	280	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	845	113	0	402	381	0	0	0	814	0	289	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	185	
Lane Group Flow (vph)	0	845	113	0	402	381	0	0	0	814	0	104	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		24.2	50.3		24.2	50.3				18.1		18.1	
Effective Green, g (s)		24.2	50.3		24.2	50.3				18.1		18.1	
Actuated g/C Ratio		0.48	1.00		0.48	1.00				0.36		0.36	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2446	1583		1703	1583				1235		570	
v/s Ratio Prot		c0.17			0.11					c0.24			
v/s Ratio Perm			0.07			0.24						0.07	
v/c Ratio		0.35	0.07		0.24	0.24				0.66		0.18	
Uniform Delay, d1		8.1	0.0		7.6	0.0				13.5		11.0	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.1	0.1		0.3	0.4				1.3		0.2	
Delay (s)		8.2	0.1		8.0	0.4				14.8		11.2	
Level of Service		A	A		A	A				B		B	
Approach Delay (s)		7.2			4.3			0.0			13.9		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			9.0									HCM Level of Service	A
HCM Volume to Capacity ratio			0.48										
Actuated Cycle Length (s)			50.3									Sum of lost time (s)	8.0
Intersection Capacity Utilization			45.0%									ICU Level of Service	A
Analysis Period (min)			15										
c	Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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		0.95	1.00		0.91	1.00	0.97		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		3539	1583		5085	1583	3433		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		3539	1583		5085	1583	3433		1583			
Volume (vph)	0	1360	250	0	620	480	130	0	1450	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1402	258	0	639	495	134	0	1495	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1402	258	0	639	495	134	0	1495	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		47.9	66.7		47.9	66.7	10.8		66.7			
Effective Green, g (s)		47.9	66.7		47.9	66.7	10.8		66.7			
Actuated g/C Ratio		0.72	1.00		0.72	1.00	0.16		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		2542	1583		3652	1583	556		1583			
v/s Ratio Prot		0.40			0.13		0.04					
v/s Ratio Perm			0.16			0.31			c0.94			
v/c Ratio		0.55	0.16		0.17	0.31	0.24		0.94			
Uniform Delay, d1		4.4	0.0		3.0	0.0	24.4		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.9	0.2		0.0	0.5	0.2		12.8			
Delay (s)		5.3	0.2		3.1	0.5	24.6		12.8			
Level of Service		A	A		A	A	C		B			
Approach Delay (s)		4.5			1.9			13.8			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay			7.2				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			66.7				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			48.0%				ICU Level of Service		A			
Analysis Period (min)			15									
c	Critical Lane Group											























HCM Signalized Intersection Capacity Analysis
23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	0.91		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	5085		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		5085	1583	1770	5085		1770		1583			
Volume (vph)	0	1600	160	590	520	0	100	0	920	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1649	165	608	536	0	103	0	948	0	0	0
RTOR Reduction (vph)	0	0	90	0	0	0	0	0	402	0	0	0
Lane Group Flow (vph)	0	1649	75	608	536	0	103	0	546	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		35.5	35.5	37.5	76.5		34.5		34.5			
Effective Green, g (s)		37.0	37.0	37.0	78.0		34.0		34.0			
Actuated g/C Ratio		0.31	0.31	0.31	0.65		0.28		0.28			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		1568	488	546	3305		502		449			
v/s Ratio Prot		c0.32		c0.34	0.11		0.06					
v/s Ratio Perm			0.05						c0.34			
v/c Ratio		1.05	0.15	1.11	0.16		0.21		1.22			
Uniform Delay, d1		41.5	30.1	41.5	8.2		32.7		43.0			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		37.7	0.1	73.6	0.0		0.1		116.1			
Delay (s)		79.2	30.3	115.1	8.2		32.8		159.1			
Level of Service		E	C	F	A		C		F			
Approach Delay (s)		74.7			65.0			146.7			0.0	
Approach LOS		E			E			F			A	
Intersection Summary												
HCM Average Control Delay			90.8			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			94.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP PM

												
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
Lane Util. Factor	1.00	0.91			0.91	1.00				1.00	1.00	1.00
Frt	1.00	1.00			1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	1770	5085			5085	1583				1770	1583	1583
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	1770	5085			5085	1583				1770	1583	1583
Volume (vph)	630	1810	0	0	1130	40	0	0	0	20	0	50
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	649	1866	0	0	1165	41	0	0	0	21	0	52
RTOR Reduction (vph)	0	0	0	0	0	28	0	0	0	0	0	48
Lane Group Flow (vph)	649	1866	0	0	1165	13	0	0	0	21	0	4
Turn Type	Prot				Perm				Prot		custom	
Protected Phases	5	2			6				8			
Permitted Phases					6							8
Actuated Green, G (s)	32.2	59.1			22.9	22.9				5.3	5.3	5.3
Effective Green, g (s)	32.2	59.1			22.9	22.9				5.3	5.3	5.3
Actuated g/C Ratio	0.44	0.82			0.32	0.32				0.07	0.07	0.07
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	787	4151			1608	501				130		116
v/s Ratio Prot	c0.37	0.37			c0.23				c0.01			
v/s Ratio Perm						0.01						0.00
v/c Ratio	0.82	0.45			0.72	0.03				0.16		0.03
Uniform Delay, d1	17.6	1.9			22.0	17.1				31.5		31.2
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	7.0	0.1			1.7	0.0				0.6		0.1
Delay (s)	24.7	2.0			23.6	17.1				32.1		31.3
Level of Service	C	A			C	B				C		C
Approach Delay (s)		7.9			23.4			0.0			31.5	
Approach LOS		A			C			A			C	
Intersection Summary												
HCM Average Control Delay			13.2		HCM Level of Service				B			
HCM Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			72.4		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			70.1%		ICU Level of Service				C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
25: Road "O" & Road "H"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	0.93		1.00	0.93		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1723		1770	1863	1583	1770	1857	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1723		1770	1723		1770	1863	1583	1770	1857	
Volume (vph)	10	10	10	40	10	10	10	340	40	10	430	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	10	41	10	10	10	351	41	10	443	10
RTOR Reduction (vph)	0	9	0	0	9	0	0	0	12	0	1	0
Lane Group Flow (vph)	10	11	0	41	11	0	10	351	29	10	452	0
Turn Type	Prot			Prot			Prot			Perm	Prot	
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases									2			
Actuated Green, G (s)	0.9	3.9		0.9	3.9		0.9	55.3	55.3	0.9	55.3	
Effective Green, g (s)	0.9	3.9		0.9	3.9		0.9	55.3	55.3	0.9	55.3	
Actuated g/C Ratio	0.01	0.05		0.01	0.05		0.01	0.72	0.72	0.01	0.72	
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)	21	87		21	87		21	1338	1137	21	1334	
v/s Ratio Prot	0.01	c0.01		c0.02	0.01		c0.01	0.19		0.01	c0.24	
v/s Ratio Perm									0.02			
v/c Ratio	0.48	0.12		1.95	0.12		0.48	0.26	0.03	0.48	0.34	
Uniform Delay, d1	37.8	34.9		38.0	34.9		37.8	3.8	3.1	37.8	4.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	16.0	0.6		562.5	0.6		16.0	0.1	0.0	16.0	0.2	
Delay (s)	53.9	35.5		600.5	35.5		53.9	3.9	3.1	53.9	4.2	
Level of Service	D	D		F	D		D	A	A	D	A	
Approach Delay (s)		41.6			415.3			5.0			5.3	
Approach LOS		D			F			A			A	
Intersection Summary												
HCM Average Control Delay			32.5				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			77.0				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			38.8%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												



















HCM Signalized Intersection Capacity Analysis
26: Road "O" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1818		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1818		1770	3539	1583	1770	3539	1583
Volume (vph)	20	70	670	350	50	10	570	150	420	30	530	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	72	691	361	52	10	588	155	433	31	546	10
RTOR Reduction (vph)	0	0	30	0	6	0	0	0	208	0	0	8
Lane Group Flow (vph)	21	72	661	361	56	0	588	155	225	31	546	2
Turn Type	Prot		pm+ov	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4	5	3	8		5	2		1		6
Permitted Phases			4						2			6
Actuated Green, G (s)	1.9	11.5	54.4	26.3	35.9		42.9	62.1	62.1	3.4	22.6	22.6
Effective Green, g (s)	1.9	11.5	54.4	26.3	35.9		42.9	62.1	62.1	3.4	22.6	22.6
Actuated g/C Ratio	0.02	0.10	0.46	0.22	0.30		0.36	0.52	0.52	0.03	0.19	0.19
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)	28	180	775	390	547		636	1842	824	50	670	300
v/s Ratio Prot	0.01	0.04	c0.31	c0.20	0.03		c0.33	0.04		0.02	c0.15	
v/s Ratio Perm			0.11						0.14			0.00
v/c Ratio	0.75	0.40	0.85	0.93	0.10		0.92	0.08	0.27	0.62	0.81	0.01
Uniform Delay, d1	58.5	50.7	28.9	45.5	30.1		36.6	14.3	16.0	57.3	46.3	39.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	71.8	1.5	9.0	27.5	0.1		19.3	0.0	0.2	20.7	7.5	0.0
Delay (s)	130.3	52.1	37.8	73.0	30.2		55.9	14.4	16.2	78.1	53.9	39.2
Level of Service	F	D	D	E	C		E	B	B	E	D	D
Approach Delay (s)		41.6			66.8			35.8			54.9	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM Average Control Delay			45.5			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			119.3	Sum of lost time (s)			12.0					
Intersection Capacity Utilization			85.5%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												






















HCM Signalized Intersection Capacity Analysis
27: Placer Parkway NB Ramps & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

													
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				0.97		1.00		0.95	1.00		0.95	1.00	
Frt				1.00		0.85		1.00	0.85		1.00	0.85	
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00	
Satd. Flow (prot)				3433		1583		3539	1583		3539	1583	
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00	
Satd. Flow (perm)				3433		1583		3539	1583		3539	1583	
Volume (vph)	0	0	0	490	0	220	0	920	370	0	940	610	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	0	0	505	0	227	0	948	381	0	969	629	
RTOR Reduction (vph)	0	0	0	0	0	22	0	0	0	0	0	0	
Lane Group Flow (vph)	0	0	0	505	0	205	0	948	381	0	969	629	
Turn Type				Prot		custom			Free			Free	
Protected Phases				8				2			6		
Permitted Phases						8			Free			Free	
Actuated Green, G (s)				12.1		12.1		14.7	34.8		14.7	34.8	
Effective Green, g (s)				12.1		12.1		14.7	34.8		14.7	34.8	
Actuated g/C Ratio				0.35		0.35		0.42	1.00		0.42	1.00	
Clearance Time (s)				4.0		4.0		4.0			4.0		
Vehicle Extension (s)				3.0		3.0		3.0			3.0		
Lane Grp Cap (vph)				1194		550		1495	1583		1495	1583	
v/s Ratio Prot				0.15				0.27			c0.27		
v/s Ratio Perm						0.13			0.24			c0.40	
v/c Ratio				0.42		0.37		0.63	0.24		0.65	0.40	
Uniform Delay, d1				8.7		8.5		7.9	0.0		8.0	0.0	
Progression Factor				1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2				0.2		0.4		0.9	0.4		1.0	0.7	
Delay (s)				8.9		8.9		8.8	0.4		9.0	0.7	
Level of Service				A		A		A	A		A	A	
Approach Delay (s)		0.0			8.9			6.4			5.7		
Approach LOS		A			A			A			A		
Intersection Summary													
HCM Average Control Delay			6.6									HCM Level of Service	A
HCM Volume to Capacity ratio			0.52										
Actuated Cycle Length (s)			34.8									Sum of lost time (s)	4.0
Intersection Capacity Utilization			46.6%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													































HCM Signalized Intersection Capacity Analysis
28: Placer Parkway SB Ramps & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

													
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	0.97		1.00					0.95	1.00		0.95	1.00	
Frt	1.00		0.85					1.00	0.85		1.00	0.85	
Flt Protected	0.95		1.00					1.00	1.00		1.00	1.00	
Satd. Flow (prot)	3433		1583					3539	1583		3539	1583	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	1.00	
Satd. Flow (perm)	3433		1583					3539	1583		3539	1583	
Volume (vph)	390	0	330	0	0	0	0	900	1090	0	1090	340	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	402	0	340	0	0	0	0	928	1124	0	1124	351	
RTOR Reduction (vph)	0	0	11	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	402	0	329	0	0	0	0	928	1124	0	1124	351	
Turn Type	Prot		custom						Free			Free	
Protected Phases	4							2			6		
Permitted Phases			4						Free			Free	
Actuated Green, G (s)	13.8		13.8					16.6	38.4		16.6	38.4	
Effective Green, g (s)	13.8		13.8					16.6	38.4		16.6	38.4	
Actuated g/C Ratio	0.36		0.36					0.43	1.00		0.43	1.00	
Clearance Time (s)	4.0		4.0					4.0			4.0		
Vehicle Extension (s)	3.0		3.0					3.0			3.0		
Lane Grp Cap (vph)	1234		569					1530	1583		1530	1583	
v/s Ratio Prot	0.12							0.26			0.32		
v/s Ratio Perm			0.21						c0.71			0.22	
v/c Ratio	0.33		0.58					0.61	0.71		0.73	0.22	
Uniform Delay, d1	8.9		9.9					8.4	0.0		9.1	0.0	
Progression Factor	1.00		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2		1.4					0.7	2.7		1.9	0.3	
Delay (s)	9.1		11.4					9.1	2.7		10.9	0.3	
Level of Service	A		B					A	A		B	A	
Approach Delay (s)		10.1			0.0			5.6			8.4		
Approach LOS		B			A			A			A		
Intersection Summary													
HCM Average Control Delay			7.4									HCM Level of Service	A
HCM Volume to Capacity ratio			0.71										
Actuated Cycle Length (s)			38.4									Sum of lost time (s)	0.0
Intersection Capacity Utilization			57.2%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
29: Road "K" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	1770	3539	1583
Volume (vph)	910	150	550	170	110	210	300	870	170	220	720	480
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	938	155	567	175	113	216	309	897	175	227	742	495
RTOR Reduction (vph)	0	0	219	0	0	187	0	0	112	0	0	342
Lane Group Flow (vph)	938	155	348	175	113	29	309	897	63	227	742	153
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	33.2	32.4	32.4	14.4	13.6	13.6	13.3	31.2	31.2	16.1	34.0	34.0
Effective Green, g (s)	33.2	32.4	32.4	14.4	13.6	13.6	13.3	31.2	31.2	16.1	34.0	34.0
Actuated g/C Ratio	0.30	0.29	0.29	0.13	0.12	0.12	0.12	0.28	0.28	0.15	0.31	0.31
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)	1035	1041	466	231	437	196	415	1003	449	259	1093	489
v/s Ratio Prot	c0.27	0.04		0.10	0.03		0.09	c0.25		c0.13	c0.21	
v/s Ratio Perm			c0.22			0.02			0.04			0.10
v/c Ratio	0.91	0.15	0.75	0.76	0.26	0.15	0.74	0.89	0.14	0.88	0.68	0.31
Uniform Delay, d1	37.0	28.7	35.1	46.2	43.7	43.1	46.8	37.9	29.4	46.0	33.3	29.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	0.1	6.4	13.2	0.3	0.4	7.1	12.1	0.7	26.5	3.4	1.7
Delay (s)	48.1	28.7	41.6	59.4	44.0	43.4	53.9	50.0	30.1	72.5	36.7	30.8
Level of Service	D	C	D	E	D	D	D	D	C	E	D	C
Approach Delay (s)		44.1			49.1			48.3			40.2	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			44.6				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			110.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			78.9%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
30: Road "J" & Road "H"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

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	0.95	1.00	1.00	0.95	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	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	50	180	40	120	290	140	50	410	150	320	480	110
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	186	41	124	299	144	52	423	155	330	495	113
RTOR Reduction (vph)	0	0	28	0	0	94	0	0	120	0	0	75
Lane Group Flow (vph)	52	186	13	124	299	50	52	423	35	330	495	38
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	2.9	22.9	22.9	5.0	25.0	25.0	4.0	16.4	16.4	12.1	24.5	24.5
Effective Green, g (s)	2.9	22.9	22.9	5.0	25.0	25.0	4.0	16.4	16.4	12.1	24.5	24.5
Actuated g/C Ratio	0.04	0.32	0.32	0.07	0.35	0.35	0.06	0.23	0.23	0.17	0.34	0.34
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)	71	589	501	122	643	547	98	802	359	296	1198	536
v/s Ratio Prot	0.03	0.10		c0.07	c0.16		0.03	c0.12		c0.19	0.14	
v/s Ratio Perm			0.01			0.03			0.02			0.02
v/c Ratio	0.73	0.32	0.03	1.02	0.47	0.09	0.53	0.53	0.10	1.11	0.41	0.07
Uniform Delay, d1	34.4	18.8	17.1	33.7	18.5	16.0	33.3	24.6	22.1	30.2	18.4	16.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.9	1.4	0.1	85.9	2.4	0.3	5.4	0.6	0.1	86.8	0.2	0.1
Delay (s)	66.3	20.2	17.2	119.6	20.9	16.3	38.7	25.2	22.3	117.0	18.7	16.3
Level of Service	E	C	B	F	C	B	D	C	C	F	B	B
Approach Delay (s)		28.3			41.3			25.6			53.0	
Approach LOS		C			D			C			D	

Intersection Summary












HCM Average Control Delay	40.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 31: Road "J" & Road "L"

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	180	70	150	290	100	80
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	186	72	155	299	103	82
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			258		794	186
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			258		794	186
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		67	90
cM capacity (veh/h)			1307		315	857
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	186	72	155	299	103	82
Volume Left	0	0	155	0	103	0
Volume Right	0	72	0	0	0	82
cSH	1700	1700	1307	1700	315	857
Volume to Capacity	0.11	0.04	0.12	0.18	0.33	0.10
Queue Length 95th (ft)	0	0	10	0	35	8
Control Delay (s)	0.0	0.0	8.1	0.0	21.9	9.6
Lane LOS			A		C	A
Approach Delay (s)	0.0		2.8		16.5	
Approach LOS					C	
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			33.3%		ICU Level of Service	A
Analysis Period (min)			15			




















HCM Signalized Intersection Capacity Analysis
32: Road "M" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3535		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3535		1770	3539
Volume (vph)	10	80	1260	10	130	1250
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	82	1299	10	134	1289
RTOR Reduction (vph)	0	73	0	0	0	0
Lane Group Flow (vph)	10	9	1309	0	134	1289
Turn Type	Perm			Prot		
Protected Phases	8		2		1	6
Permitted Phases	8					
Actuated Green, G (s)	7.0	7.0	37.3		7.0	48.3
Effective Green, g (s)	7.0	7.0	37.3		7.0	48.3
Actuated g/C Ratio	0.11	0.11	0.59		0.11	0.76
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)	196	175	2083		196	2700
v/s Ratio Prot	0.01		c0.37		c0.08	0.36
v/s Ratio Perm	c0.01					
v/c Ratio	0.05	0.05	0.63		0.68	0.48
Uniform Delay, d1	25.2	25.2	8.5		27.1	2.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.1	1.4		9.5	0.6
Delay (s)	25.3	25.3	9.9		36.5	3.4
Level of Service	C	C	A		D	A
Approach Delay (s)	25.3		9.9			6.5
Approach LOS	C		A			A
Intersection Summary						
HCM Average Control Delay			8.7	HCM Level of Service		A
HCM Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			63.3	Sum of lost time (s)	12.0	
Intersection Capacity Utilization			55.7%	ICU Level of Service	B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
33: Road "M" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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)	10	10	130	10	10	10	80	10	10	10	10	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	134	10	10	10	82	10	10	10	10	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	1190											
pX, platoon unblocked												
vC, conflicting volume	21			144			82	72	10	82	201	15
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	21			144			82	72	10	82	201	15
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 %	99			99			91	99	99	99	98	99
cM capacity (veh/h)	1595			1438			877	807	1071	878	686	1064
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1						
Volume Total	21	134	31	82	21	31						
Volume Left	10	0	10	82	0	10						
Volume Right	0	134	10	0	10	10						
cSH	1595	1700	1438	877	921	848						
Volume to Capacity	0.01	0.08	0.01	0.09	0.02	0.04						
Queue Length 95th (ft)	0	0	1	8	2	3						
Control Delay (s)	3.7	0.0	2.5	9.5	9.0	9.4						
Lane LOS	A		A	A	A	A						
Approach Delay (s)	0.5		2.5	9.4		9.4						
Approach LOS				A		A						
Intersection Summary												
Average Delay			4.4									
Intersection Capacity Utilization			26.1%		ICU Level of Service			A				
Analysis Period (min)	15											















HCM Unsignalized Intersection Capacity Analysis
 34: Road "M" & Road "G"



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕	↕	
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	10	10	10	30	30	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	10	10	31	31	10
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	88	36	41			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	88	36	41			
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)	907	1036	1568			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	21	41	41			
Volume Left	10	10	0			
Volume Right	10	0	10			
cSH	968	1568	1700			
Volume to Capacity	0.02	0.01	0.02			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	8.8	1.9	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	1.9	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			18.8%	ICU Level of Service	A	
Analysis Period (min)			15			























HCM Signalized Intersection Capacity Analysis
35: Road "D" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	200	620	640	310	770	470
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	206	639	660	320	794	485
RTOR Reduction (vph)	0	526	0	238	0	0
Lane Group Flow (vph)	206	113	660	82	794	485
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	18.1	18.1	26.1	26.1	46.1	76.2
Effective Green, g (s)	18.1	18.1	26.1	26.1	46.1	76.2
Actuated g/C Ratio	0.18	0.18	0.26	0.26	0.45	0.74
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)	313	280	903	404	798	2636
v/s Ratio Prot	c0.12		c0.19		c0.45	0.14
v/s Ratio Perm		0.07		0.05		
v/c Ratio	0.66	0.40	0.73	0.20	0.99	0.18
Uniform Delay, d1	39.2	37.3	34.9	29.9	28.0	3.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	1.0	5.2	1.1	30.7	0.2
Delay (s)	44.2	38.3	40.1	31.0	58.7	4.0
Level of Service	D	D	D	C	E	A
Approach Delay (s)	39.7		37.1			37.9
Approach LOS	D		D			D
Intersection Summary						
HCM Average Control Delay			38.2		HCM Level of Service	D
HCM Volume to Capacity ratio			0.85			
Actuated Cycle Length (s)			102.3		Sum of lost time (s)	12.0
Intersection Capacity Utilization			81.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
36: Road "D" & Road "J"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1859		1770	1863	1583	1770	1723		1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1859		1770	1863	1583	1770	1723		1770	1863	1583
Volume (vph)	300	770	10	10	650	120	10	10	10	90	10	190
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	309	794	10	10	670	124	10	10	10	93	10	196
RTOR Reduction (vph)	0	0	0	0	0	74	0	9	0	0	0	169
Lane Group Flow (vph)	309	804	0	10	670	50	10	11	0	93	10	27
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases						6						8
Actuated Green, G (s)	16.3	44.1		4.1	31.9	31.9	4.1	4.5		10.6	11.0	11.0
Effective Green, g (s)	16.3	44.1		4.1	31.9	31.9	4.1	4.5		10.6	11.0	11.0
Actuated g/C Ratio	0.21	0.56		0.05	0.40	0.40	0.05	0.06		0.13	0.14	0.14
Clearance Time (s)	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
Lane Grp Cap (vph)	364	1034		92	749	637	92	98		237	258	220
v/s Ratio Prot	c0.17	0.43		0.01	c0.36		0.01	0.01		c0.05	0.01	
v/s Ratio Perm						0.03						c0.02
v/c Ratio	0.85	0.78		0.11	0.89	0.08	0.11	0.11		0.39	0.04	0.12
Uniform Delay, d1	30.3	13.8		35.9	22.1	14.6	35.9	35.5		31.4	29.6	29.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	16.6	3.7		0.5	13.2	0.1	0.5	0.5		1.1	0.1	0.3
Delay (s)	46.9	17.5		36.4	35.3	14.7	36.4	36.0		32.5	29.6	30.2
Level of Service	D	B		D	D	B	D	D		C	C	C
Approach Delay (s)		25.7			32.1			36.1			30.9	
Approach LOS		C			C			D			C	

Intersection Summary

HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 37: Road "J" & Road "A"

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Sign Control	Stop			Stop	Stop	
Volume (vph)	60	170	250	70	260	420
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	62	175	258	72	268	433
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total (vph)	62	175	258	72	268	433
Volume Left (vph)	0	0	258	0	268	0
Volume Right (vph)	0	175	0	0	0	433
Hadj (s)	0.03	-0.67	0.53	0.03	0.53	-0.67
Departure Headway (s)	7.0	6.3	7.3	6.8	6.7	5.5
Degree Utilization, x	0.12	0.31	0.52	0.14	0.50	0.67
Capacity (veh/h)	483	540	476	502	512	628
Control Delay (s)	9.8	10.9	16.9	9.7	15.1	17.6
Approach Delay (s)	10.6		15.3		16.7	
Approach LOS	B		C		C	
Intersection Summary						
Delay			15.2			
HCM Level of Service			C			
Intersection Capacity Utilization			41.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 38: Road "J" & Road "L"

























Sutter Pointe EIR
 Cumulative Plus Project With PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↖
Sign Control		Stop	Stop		Stop	
Volume (vph)	440	40	50	150	110	260
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	454	41	52	155	113	268
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total (vph)	454	41	52	155	113	268
Volume Left (vph)	454	0	0	0	113	0
Volume Right (vph)	0	0	0	155	0	268
Hadj (s)	0.53	0.03	0.03	-0.67	0.53	-0.67
Departure Headway (s)	6.5	6.0	6.4	5.7	7.0	5.8
Degree Utilization, x	0.82	0.07	0.09	0.25	0.22	0.43
Capacity (veh/h)	547	578	523	590	486	585
Control Delay (s)	30.9	8.2	8.9	9.4	10.8	11.9
Approach Delay (s)	29.0		9.3		11.6	
Approach LOS	D		A		B	
Intersection Summary						
Delay			19.1			
HCM Level of Service			C			
Intersection Capacity Utilization			43.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
39: Road "J" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3519	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3519	
Volume (vph)	20	130	30	50	120	50	70	900	100	210	1030	40
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	134	31	52	124	52	72	928	103	216	1062	41
RTOR Reduction (vph)	0	0	26	0	0	42	0	0	57	0	2	0
Lane Group Flow (vph)	21	134	5	52	124	10	72	928	46	216	1101	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.9	15.1	15.1	7.0	19.2	19.2	26.4	36.5	36.5	26.4	36.5	
Effective Green, g (s)	2.9	15.1	15.1	7.0	19.2	19.2	26.4	36.5	36.5	26.4	36.5	
Actuated g/C Ratio	0.03	0.15	0.15	0.07	0.19	0.19	0.26	0.36	0.36	0.26	0.36	
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)	51	279	237	123	354	301	463	1279	572	463	1272	
v/s Ratio Prot	0.01	c0.07		c0.03	0.07		0.04	0.26		c0.12	c0.31	
v/s Ratio Perm			0.00			0.01			0.03			
v/c Ratio	0.41	0.48	0.02	0.42	0.35	0.03	0.16	0.73	0.08	0.47	0.87	
Uniform Delay, d1	48.2	39.4	36.6	45.1	35.5	33.3	28.7	27.9	21.2	31.4	30.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.3	1.3	0.0	2.3	0.6	0.0	0.7	3.6	0.3	3.4	8.0	
Delay (s)	53.5	40.7	36.7	47.4	36.1	33.4	29.4	31.5	21.5	34.7	38.0	
Level of Service	D	D	D	D	D	C	C	C	C	C	D	
Approach Delay (s)		41.4			38.1			30.5			37.5	
Approach LOS		D			D			C			D	

Intersection Summary

HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	101.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			















HCM Signalized Intersection Capacity Analysis
40: Road "J" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3534		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3534		1770	3539	1583
Volume (vph)	80	10	220	10	10	10	70	940	10	10	630	90
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	10	227	10	10	10	72	969	10	10	649	93
RTOR Reduction (vph)	0	0	188	0	9	0	0	1	0	0	0	51
Lane Group Flow (vph)	82	10	39	10	11	0	72	978	0	10	649	42
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	5.4	8.9	8.9	0.6	4.1		2.6	25.6		0.6	23.6	23.6
Effective Green, g (s)	5.4	8.9	8.9	0.6	4.1		2.6	25.6		0.6	23.6	23.6
Actuated g/C Ratio	0.10	0.17	0.17	0.01	0.08		0.05	0.50		0.01	0.46	0.46
Clearance Time (s)	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
Lane Grp Cap (vph)	185	321	273	21	137		89	1750		21	1615	723
v/s Ratio Prot	c0.05	0.01		0.01	0.01		c0.04	c0.28		0.01	0.18	
v/s Ratio Perm			c0.02									0.03
v/c Ratio	0.44	0.03	0.14	0.48	0.08		0.81	0.56		0.48	0.40	0.06
Uniform Delay, d1	21.7	17.8	18.2	25.4	22.1		24.3	9.1		25.4	9.4	7.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.7	0.0	0.2	16.0	0.2		39.8	0.4		16.0	0.2	0.0
Delay (s)	23.4	17.9	18.4	41.4	22.3		64.1	9.5		41.4	9.5	7.9
Level of Service	C	B	B	D	C		E	A		D	A	A
Approach Delay (s)		19.7			28.7			13.2			9.7	
Approach LOS		B			C			B			A	
Intersection Summary												
HCM Average Control Delay			13.2				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			51.7				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			50.7%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
41: Road "G" & Road "A"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	3539	1583	1770	3539
Volume (vph)	190	30	930	370	30	550
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	196	31	959	381	31	567
RTOR Reduction (vph)	0	25	0	177	0	0
Lane Group Flow (vph)	196	6	959	204	31	567
Turn Type		Perm		Perm	Prot	
Protected Phases	4		2		1	6
Permitted Phases		4		2		
Actuated Green, G (s)	10.6	10.6	27.8	27.8	1.4	33.2
Effective Green, g (s)	10.6	10.6	27.8	27.8	1.4	33.2
Actuated g/C Ratio	0.20	0.20	0.54	0.54	0.03	0.64
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)	362	324	1899	850	48	2268
v/s Ratio Prot	c0.11		c0.27		c0.02	0.16
v/s Ratio Perm		0.00		0.13		
v/c Ratio	0.54	0.02	0.51	0.24	0.65	0.25
Uniform Delay, d1	18.4	16.5	7.6	6.4	25.0	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.0	0.2	0.1	26.1	0.1
Delay (s)	20.1	16.5	7.8	6.5	51.0	4.0
Level of Service	C	B	A	A	D	A
Approach Delay (s)	19.6		7.5			6.5
Approach LOS	B		A			A
Intersection Summary						
HCM Average Control Delay			8.5		HCM Level of Service	A
HCM Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			51.8		Sum of lost time (s)	12.0
Intersection Capacity Utilization			42.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
42: Road "G" & Pacific Avenue

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1833		1770	1840		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1833		1770	1840		1770	3539	1583	1770	3539	1583
Volume (vph)	140	170	20	60	110	10	50	920	100	10	1020	80
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	144	175	21	62	113	10	52	948	103	10	1052	82
RTOR Reduction (vph)	0	8	0	0	6	0	0	0	68	0	0	54
Lane Group Flow (vph)	144	188	0	62	117	0	52	948	35	10	1052	28
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases									2			6
Actuated Green, G (s)	4.6	12.9		2.2	10.5		4.1	18.5	18.5	4.1	18.5	18.5
Effective Green, g (s)	4.6	12.9		2.2	10.5		4.1	18.5	18.5	4.1	18.5	18.5
Actuated g/C Ratio	0.09	0.24		0.04	0.20		0.08	0.34	0.34	0.08	0.34	0.34
Clearance Time (s)	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
Lane Grp Cap (vph)	152	440		73	360		135	1219	545	135	1219	545
v/s Ratio Prot	c0.08	c0.10		0.04	0.06		c0.03	0.27		0.01	c0.30	
v/s Ratio Perm									0.02			0.02
v/c Ratio	0.95	0.43		0.85	0.32		0.39	0.78	0.07	0.07	0.86	0.05
Uniform Delay, d1	24.4	17.3		25.6	18.6		23.6	15.8	11.8	23.0	16.4	11.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	56.7	0.7		56.4	0.5		1.8	3.2	0.1	0.2	6.5	0.0
Delay (s)	81.2	17.9		82.0	19.1		25.4	19.0	11.9	23.3	22.9	11.8
Level of Service	F	B		F	B		C	B	B	C	C	B
Approach Delay (s)		44.7			40.2			18.6			22.1	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM Average Control Delay			24.7				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			53.7				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			59.0%				ICU Level of Service				B	
Analysis Period (min)			15									
c Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
43: Road "G" & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

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
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1782		1770	1676		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1782		1770	1676		1770	3539	1583	1770	3539	1583
Volume (vph)	90	50	20	190	40	80	10	820	220	110	610	70
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	52	21	196	41	82	10	845	227	113	629	72
RTOR Reduction (vph)	0	18	0	0	65	0	0	0	153	0	0	49
Lane Group Flow (vph)	93	55	0	196	58	0	10	845	74	113	629	23
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases									2			6
Actuated Green, G (s)	4.1	6.2		8.5	10.6		4.3	16.9	16.9	4.3	16.9	16.9
Effective Green, g (s)	4.1	6.2		8.5	10.6		4.3	16.9	16.9	4.3	16.9	16.9
Actuated g/C Ratio	0.08	0.12		0.16	0.20		0.08	0.33	0.33	0.08	0.33	0.33
Clearance Time (s)	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
Lane Grp Cap (vph)	140	213		290	342		147	1152	515	147	1152	515
v/s Ratio Prot	0.05	c0.03		c0.11	0.03		0.01	c0.24		c0.06	0.18	
v/s Ratio Perm									0.05			0.01
v/c Ratio	0.66	0.26		0.68	0.17		0.07	0.73	0.14	0.77	0.55	0.05
Uniform Delay, d1	23.2	20.8		20.4	17.0		22.0	15.5	12.4	23.3	14.4	12.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	0.6		6.1	0.2		0.2	2.5	0.1	21.1	0.5	0.0
Delay (s)	34.5	21.4		26.5	17.3		22.1	18.0	12.5	44.4	14.9	12.0
Level of Service	C	C		C	B		C	B	B	D	B	B
Approach Delay (s)		28.7			22.9			16.9			18.7	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			19.1			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			51.9			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			56.0%			ICU Level of Service		B				
Analysis Period (min)			15									
c Critical Lane Group												























HCM Signalized Intersection Capacity Analysis
44: Road "G" & Road "D"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.93		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1638		1770	1723		1770	3533		1770	3533	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1638		1770	1723		1770	3533		1770	3533	
Volume (vph)	10	10	40	10	10	10	50	760	10	10	850	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	41	10	10	10	52	784	10	10	876	10
RTOR Reduction (vph)	0	37	0	0	9	0	0	1	0	0	1	0
Lane Group Flow (vph)	10	14	0	10	11	0	52	793	0	10	885	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.8	6.6		0.8	6.6		2.0	46.9		0.8	45.7	
Effective Green, g (s)	0.8	6.6		0.8	6.6		2.0	46.9		0.8	45.7	
Actuated g/C Ratio	0.01	0.09		0.01	0.09		0.03	0.66		0.01	0.64	
Clearance Time (s)	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	
Lane Grp Cap (vph)	20	152		20	160		50	2330		20	2271	
v/s Ratio Prot	c0.01	c0.01		0.01	0.01		c0.03	0.22		0.01	c0.25	
v/s Ratio Perm												
v/c Ratio	0.50	0.09		0.50	0.07		1.04	0.34		0.50	0.39	
Uniform Delay, d1	35.0	29.5		35.0	29.4		34.5	5.3		35.0	6.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.3	0.3		18.3	0.2		139.1	0.1		18.3	0.1	
Delay (s)	53.3	29.8		53.3	29.6		173.7	5.4		53.3	6.2	
Level of Service	D	C		D	C		F	A		D	A	
Approach Delay (s)		33.6			37.5			15.7			6.7	
Approach LOS		C			D			B			A	
Intersection Summary												
HCM Average Control Delay			12.3				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			71.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			44.4%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
45: Riego Rd & Road "U"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3529		1770	3539	1583	1770	1863	1583	1770	1646	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3529		1770	3539	1583	1770	1863	1583	1770	1646	
Volume (vph)	90	500	10	200	470	130	10	20	330	350	20	70
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	515	10	206	485	134	10	21	340	361	21	72
RTOR Reduction (vph)	0	1	0	0	0	100	0	0	305	0	66	0
Lane Group Flow (vph)	93	524	0	206	485	34	10	21	35	361	27	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases						6			4			
Actuated Green, G (s)	26.1	26.1		26.1	26.1	26.1	27.0	10.7	10.7	24.9	8.6	
Effective Green, g (s)	26.1	26.1		26.1	26.1	26.1	27.0	10.7	10.7	24.9	8.6	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.26	0.10	0.10	0.24	0.08	
Clearance Time (s)	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	
Lane Grp Cap (vph)	445	887		445	890	398	460	192	163	425	136	
v/s Ratio Prot	0.05	c0.15		c0.12	0.14		0.01	0.01		c0.20	0.02	
v/s Ratio Perm						0.02			c0.02			
v/c Ratio	0.21	0.59		0.46	0.54	0.08	0.02	0.11	0.22	0.85	0.20	
Uniform Delay, d1	30.7	34.2		32.9	33.7	29.7	28.6	42.2	42.7	37.7	44.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	2.9		3.4	2.4	0.4	0.1	0.3	0.7	14.6	0.7	
Delay (s)	31.8	37.0		36.3	36.1	30.1	28.7	42.5	43.4	52.3	45.1	
Level of Service	C	D		D	D	C	C	D	D	D	D	
Approach Delay (s)		36.2			35.2			42.9			50.8	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			39.9	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			103.8	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			64.0%	ICU Level of Service				B				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
46: Riego Rd & Road "R"

Sutter Pointe EIR
Cumulative Plus Project With PP PM
































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
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1818		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1818		1770	1863	1583
Volume (vph)	200	1070	60	10	650	200	40	50	10	410	50	190
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	206	1103	62	10	670	206	41	52	10	423	52	196
RTOR Reduction (vph)	0	0	28	0	0	127	0	6	0	0	0	141
Lane Group Flow (vph)	206	1103	34	10	670	79	41	56	0	423	52	55
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						8
Actuated Green, G (s)	18.8	40.2	40.2	26.1	47.5	47.5	7.1	9.7		32.2	34.8	34.8
Effective Green, g (s)	18.8	40.2	40.2	26.1	47.5	47.5	7.1	9.7		32.2	34.8	34.8
Actuated g/C Ratio	0.15	0.32	0.32	0.21	0.38	0.38	0.06	0.08		0.26	0.28	0.28
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)	268	1145	512	372	1353	605	101	142		459	522	444
v/s Ratio Prot	c0.12	c0.31		0.01	c0.19		0.02	c0.03		c0.24	0.03	
v/s Ratio Perm			0.02			0.05						0.03
v/c Ratio	0.77	0.96	0.07	0.03	0.50	0.13	0.41	0.40		0.92	0.10	0.12
Uniform Delay, d1	50.6	41.3	29.0	39.0	29.2	24.9	56.5	54.5		44.8	33.1	33.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.4	19.1	0.2	0.1	1.3	0.4	2.7	1.8		26.4	0.1	0.1
Delay (s)	63.1	60.4	29.3	39.1	30.5	25.4	59.2	56.3		71.1	33.2	33.5
Level of Service	E	E	C	D	C	C	E	E		E	C	C
Approach Delay (s)		59.4			29.4			57.4			57.2	
Approach LOS		E			C			E			E	

Intersection Summary

HCM Average Control Delay	50.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	124.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
51: Riego Rd & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	810	1470	150	130	1360	140	170	260	130	240	250	410
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	835	1515	155	134	1402	144	175	268	134	247	258	423
RTOR Reduction (vph)	0	0	74	0	0	79	0	0	113	0	0	324
Lane Group Flow (vph)	835	1515	81	134	1402	65	175	268	21	247	258	99
Turn Type	Prot		Perm	Prot	Perm		Prot	Perm		Prot	Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	28.2	52.6	52.6	11.9	36.3	36.3	13.8	17.5	17.5	13.1	16.8	16.8
Effective Green, g (s)	28.2	52.6	52.6	11.9	36.3	36.3	13.8	17.5	17.5	13.1	16.8	16.8
Actuated g/C Ratio	0.25	0.47	0.47	0.11	0.33	0.33	0.12	0.16	0.16	0.12	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	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)	871	2407	749	190	1661	517	220	557	249	209	535	239
v/s Ratio Prot	c0.24	0.30		0.08	c0.28		0.10	c0.08		c0.14	0.07	
v/s Ratio Perm			0.05			0.04			0.01			0.06
v/c Ratio	0.96	0.63	0.11	0.71	0.84	0.12	0.80	0.48	0.08	1.18	0.48	0.41
Uniform Delay, d1	40.9	21.9	16.2	47.9	34.8	26.3	47.3	42.7	40.0	49.0	43.2	42.7
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	20.8	1.3	0.3	11.3	5.4	0.5	17.8	0.7	0.1	120.0	0.7	1.2
Delay (s)	61.7	23.2	16.5	59.2	40.2	26.7	65.0	43.3	40.1	169.0	43.9	43.8
Level of Service	E	C	B	E	D	C	E	D	D	F	D	D
Approach Delay (s)		35.6			40.6			49.2			77.2	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM Average Control Delay			45.2	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			111.1	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			83.2%	ICU Level of Service				E				
Analysis Period (min)			15									
c Critical Lane Group												













HCM Signalized Intersection Capacity Analysis
52: Riego Rd & Road "D"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

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	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	0.97	0.95	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	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	300	1010	210	240	1010	430	170	290	260	860	290	100
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	309	1041	216	247	1041	443	175	299	268	887	299	103
RTOR Reduction (vph)	0	0	139	0	0	295	0	0	230	0	0	73
Lane Group Flow (vph)	309	1041	77	247	1041	148	175	299	38	887	299	30
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Actuated Green, G (s)	25.1	39.0	39.0	22.2	36.1	36.1	17.6	19.0	19.0	37.1	38.5	38.5
Effective Green, g (s)	25.1	39.0	39.0	22.2	36.1	36.1	17.6	19.0	19.0	37.1	38.5	38.5
Actuated g/C Ratio	0.19	0.29	0.29	0.17	0.27	0.27	0.13	0.14	0.14	0.28	0.29	0.29
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)	333	1488	463	295	1377	429	234	504	226	955	1022	457
v/s Ratio Prot	c0.17	c0.20		0.14	c0.20		0.10	c0.08		c0.26	0.08	
v/s Ratio Perm			0.05			0.09			0.02			0.02
v/c Ratio	0.93	0.70	0.17	0.84	0.76	0.35	0.75	0.59	0.17	0.93	0.29	0.07
Uniform Delay, d1	53.2	41.9	35.1	53.8	44.6	39.1	55.7	53.5	50.2	46.8	36.8	34.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.0	2.8	0.8	18.3	3.9	2.2	12.3	1.9	0.4	16.3	0.2	0.1
Delay (s)	84.2	44.7	35.8	72.1	48.5	41.3	68.0	55.4	50.6	63.1	37.0	34.4
Level of Service	F	D	D	E	D	D	E	E	D	E	D	C
Approach Delay (s)		51.3			50.0			56.6			54.8	
Approach LOS		D			D			E			D	
Intersection Summary												
HCM Average Control Delay			52.5			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			133.3	Sum of lost time (s)			20.0					
Intersection Capacity Utilization			82.0%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
53: Road "T" & Power Line Rd

Sutter Pointe EIR
Cumulative Plus Project With PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
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	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	460	20	300	300	10	230
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	474	21	309	309	10	237
RTOR Reduction (vph)	0	13	0	226	0	0
Lane Group Flow (vph)	474	8	309	83	10	237
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	17.4	17.4	13.1	13.1	6.0	23.1
Effective Green, g (s)	17.4	17.4	13.1	13.1	6.0	23.1
Actuated g/C Ratio	0.36	0.36	0.27	0.27	0.12	0.48
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)	635	568	503	428	219	887
v/s Ratio Prot	c0.27		c0.17		0.01	c0.13
v/s Ratio Perm		0.00		0.05		
v/c Ratio	0.75	0.01	0.61	0.20	0.05	0.27
Uniform Delay, d1	13.6	10.0	15.5	13.6	18.7	7.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	0.0	2.2	0.2	0.1	0.2
Delay (s)	18.4	10.0	17.7	13.9	18.8	7.8
Level of Service	B	B	B	B	B	A
Approach Delay (s)	18.0		15.8			8.2
Approach LOS	B		B			A
Intersection Summary						
HCM Average Control Delay			15.2		HCM Level of Service	B
HCM Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			48.5		Sum of lost time (s)	12.0
Intersection Capacity Utilization			47.9%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
54: Road "T" & Road "U"















Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	70	180	200	10	10	90
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	72	186	206	10	10	93
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	216				541	211
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216				541	211
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				98	89
cM capacity (veh/h)	1353				475	829

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	72	186	216	10	93
Volume Left	72	0	0	10	0
Volume Right	0	0	10	0	93
cSH	1353	1700	1700	475	829
Volume to Capacity	0.05	0.11	0.13	0.02	0.11
Queue Length 95th (ft)	4	0	0	2	9
Control Delay (s)	7.8	0.0	0.0	12.7	9.9
Lane LOS	A			B	A
Approach Delay (s)	2.2		0.0	10.2	
Approach LOS				B	

Intersection Summary					
Average Delay			2.8		
Intersection Capacity Utilization		28.3%		ICU Level of Service	A
Analysis Period (min)		15			

HCM Unsignalized Intersection Capacity Analysis
55: Road "Q" & Road "R"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	60	20	100	210	10	40
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	62	21	103	216	10	41
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	165	103			320	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	165	103			320	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	98			99	
cM capacity (veh/h)	819	952			1240	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	62	21	103	216	10	41
Volume Left	62	0	0	0	10	0
Volume Right	0	21	0	216	0	0
cSH	819	952	1700	1700	1240	1700
Volume to Capacity	0.08	0.02	0.06	0.13	0.01	0.02
Queue Length 95th (ft)	6	2	0	0	1	0
Control Delay (s)	9.8	8.9	0.0	0.0	7.9	0.0
Lane LOS	A	A			A	
Approach Delay (s)	9.5		0.0		1.6	
Approach LOS	A					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			23.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
56: Road "T" & Road "R"



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	230	70	90	80	20	90
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	237	72	93	82	21	93
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	175				639	93
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175				639	93
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	83				94	90
cM capacity (veh/h)	1401				366	964
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	237	72	93	82	21	93
Volume Left	237	0	0	0	21	0
Volume Right	0	0	0	82	0	93
cSH	1401	1700	1700	1700	366	964
Volume to Capacity	0.17	0.04	0.05	0.05	0.06	0.10
Queue Length 95th (ft)	15	0	0	0	4	8
Control Delay (s)	8.1	0.0	0.0	0.0	15.4	9.1
Lane LOS	A				C	A
Approach Delay (s)	6.2		0.0		10.3	
Approach LOS					B	
Intersection Summary						
Average Delay			5.2			
Intersection Capacity Utilization			29.4%		ICU Level of Service	A
Analysis Period (min)			15			
























HCM Signalized Intersection Capacity Analysis
57: Road "Q" & Road "S"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

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	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1844		1770	1863	1583	1770	1863	1583	1770	1853	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1844		1770	1863	1583	1770	1863	1583	1770	1853	
Volume (vph)	10	280	20	200	120	30	10	360	440	120	260	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	289	21	206	124	31	10	371	454	124	268	10
RTOR Reduction (vph)	0	2	0	0	0	19	0	0	342	0	2	0
Lane Group Flow (vph)	10	308	0	206	124	12	10	371	112	124	276	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	0.8	21.7		15.4	36.3	36.3	20.1	24.1	24.1	20.1	24.1	
Effective Green, g (s)	0.8	21.7		15.4	36.3	36.3	20.1	24.1	24.1	20.1	24.1	
Actuated g/C Ratio	0.01	0.22		0.16	0.37	0.37	0.21	0.25	0.25	0.21	0.25	
Clearance Time (s)	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	
Lane Grp Cap (vph)	15	411		280	695	591	366	461	392	366	459	
v/s Ratio Prot	0.01	c0.17		c0.12	0.07		0.01	c0.20		c0.07	0.15	
v/s Ratio Perm						0.01			0.07			
v/c Ratio	0.67	0.75		0.74	0.18	0.02	0.03	0.80	0.29	0.34	0.60	
Uniform Delay, d1	48.1	35.3		39.0	20.5	19.3	30.8	34.4	29.6	32.9	32.4	
Progression Factor	1.04	0.98		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	75.8	7.3		9.6	0.1	0.0	0.1	13.9	1.8	2.5	5.8	
Delay (s)	125.9	41.8		48.6	20.6	19.3	30.9	48.3	31.5	35.4	38.1	
Level of Service	F	D		D	C	B	C	D	C	D	D	
Approach Delay (s)		44.4			36.5			38.9			37.3	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			39.1				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			97.3				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			66.0%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

































HCM Signalized Intersection Capacity Analysis
58: Road "B" North & Road "A"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1723		1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1723		1770	3539	1583	1770	3539	1583
Volume (vph)	270	60	50	40	10	10	50	1010	270	10	670	200
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	278	62	52	41	10	10	52	1041	278	10	691	206
RTOR Reduction (vph)	0	0	39	0	9	0	0	0	152	0	0	117
Lane Group Flow (vph)	278	62	13	41	11	0	52	1041	126	10	691	89
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	14.4	15.5	15.5	2.1	3.2		1.7	28.2	28.2	0.6	27.1	27.1
Effective Green, g (s)	14.4	15.5	15.5	2.1	3.2		1.7	28.2	28.2	0.6	27.1	27.1
Actuated g/C Ratio	0.23	0.25	0.25	0.03	0.05		0.03	0.45	0.45	0.01	0.43	0.43
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)	408	463	393	60	88		48	1599	715	17	1537	687
v/s Ratio Prot	c0.16	c0.03		0.02	0.01		c0.03	c0.29		0.01	0.20	
v/s Ratio Perm			0.01						0.08			0.06
v/c Ratio	0.68	0.13	0.03	0.68	0.12		1.08	0.65	0.18	0.59	0.45	0.13
Uniform Delay, d1	21.9	18.2	17.8	29.8	28.3		30.3	13.3	10.2	30.8	12.4	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1	0.0	27.6	0.6		155.3	1.0	0.1	42.8	0.2	0.1
Delay (s)	26.5	18.4	17.8	57.4	28.9		185.6	14.2	10.3	73.5	12.6	10.7
Level of Service	C	B	B	E	C		F	B	B	E	B	B
Approach Delay (s)		24.1			48.0			19.9			12.8	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM Average Control Delay			18.8				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			62.4				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			62.9%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
59: Road "B" South & Road "A"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

													
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	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583	
Volume (vph)	890	210	130	30	70	180	80	520	50	180	410	410	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	918	216	134	31	72	186	82	536	52	186	423	423	
RTOR Reduction (vph)	0	0	85	0	0	158	0	0	36	0	0	274	
Lane Group Flow (vph)	918	216	49	31	72	28	82	536	16	186	423	149	
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8			2			6	
Actuated Green, G (s)	21.1	32.3	32.3	2.2	13.4	13.4	6.8	28.0	28.0	10.1	31.3	31.3	
Effective Green, g (s)	21.1	32.3	32.3	2.2	13.4	13.4	6.8	28.0	28.0	10.1	31.3	31.3	
Actuated g/C Ratio	0.24	0.36	0.36	0.02	0.15	0.15	0.08	0.32	0.32	0.11	0.35	0.35	
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)	818	679	577	44	282	239	136	1118	500	202	1250	559	
v/s Ratio Prot	c0.27	c0.12		0.02	0.04		0.05	c0.15		c0.11	c0.12		
v/s Ratio Perm			0.03			0.02			0.01			0.09	
v/c Ratio	1.12	0.32	0.08	0.70	0.26	0.12	0.60	0.48	0.03	0.92	0.34	0.27	
Uniform Delay, d1	33.8	20.2	18.5	42.9	33.2	32.5	39.6	24.4	20.9	38.9	21.0	20.5	
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	70.7	0.3	0.1	40.4	0.5	0.2	7.3	1.5	0.1	41.7	0.7	1.2	
Delay (s)	104.5	20.5	18.5	83.3	33.7	32.7	46.9	25.9	21.1	80.5	21.8	21.6	
Level of Service	F	C	B	F	C	C	D	C	C	F	C	C	
Approach Delay (s)		81.1			38.4			28.1			32.3		
Approach LOS		F			D			C			C		
Intersection Summary													
HCM Average Control Delay			51.0									HCM Level of Service	D
HCM Volume to Capacity ratio			0.69										
Actuated Cycle Length (s)			88.6									Sum of lost time (s)	16.0
Intersection Capacity Utilization			66.4%									ICU Level of Service	C
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 60: Road "B" North & Pacific Avenue

Sutter Pointe EIR
 Cumulative Plus Project With PP PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷		↶	↷
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	440	180	60	10	20	30
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	454	186	62	10	21	31
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	62				1160	67
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	62				1160	67
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	71				86	97
cM capacity (veh/h)	1541				153	997

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	454	186	72	21	31
Volume Left	454	0	0	21	0
Volume Right	0	0	10	0	31
cSH	1541	1700	1700	153	997
Volume to Capacity	0.29	0.11	0.04	0.14	0.03
Queue Length 95th (ft)	31	0	0	11	2
Control Delay (s)	8.3	0.0	0.0	32.2	8.7
Lane LOS	A			D	A
Approach Delay (s)	5.9		0.0	18.1	
Approach LOS				C	

Intersection Summary					
Average Delay			6.2		
Intersection Capacity Utilization		41.0%		ICU Level of Service	A
Analysis Period (min)			15		

HCM Signalized Intersection Capacity Analysis
61: Road "B" North & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

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	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1773		1770	3512		1770	3511	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1773		1770	3512		1770	3511	
Volume (vph)	80	60	50	10	20	10	30	380	20	10	370	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	82	62	52	10	21	10	31	392	21	10	381	21
RTOR Reduction (vph)	0	0	42	0	9	0	0	4	0	0	4	0
Lane Group Flow (vph)	82	62	10	10	22	0	31	409	0	10	398	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	8.3	11.5	11.5	0.7	3.9		0.7	28.8		0.7	28.8	
Effective Green, g (s)	8.3	11.5	11.5	0.7	3.9		0.7	28.8		0.7	28.8	
Actuated g/C Ratio	0.14	0.20	0.20	0.01	0.07		0.01	0.50		0.01	0.50	
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)	255	371	316	21	120		21	1753		21	1752	
v/s Ratio Prot	c0.05	c0.03		0.01	0.01		c0.02	c0.12		0.01	0.11	
v/s Ratio Perm			0.01									
v/c Ratio	0.32	0.17	0.03	0.48	0.18		1.48	0.23		0.48	0.23	
Uniform Delay, d1	22.2	19.1	18.6	28.3	25.4		28.5	8.2		28.3	8.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.2	0.0	16.0	0.7		368.7	0.1		16.0	0.1	
Delay (s)	22.9	19.3	18.7	44.4	26.1		397.2	8.3		44.4	8.2	
Level of Service	C	B	B	D	C		F	A		D	A	
Approach Delay (s)		20.7			30.6			35.4			9.1	
Approach LOS		C			C			D			A	
Intersection Summary												
HCM Average Control Delay			22.7				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.25									
Actuated Cycle Length (s)			57.7				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			35.6%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

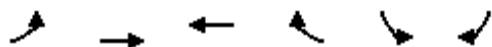
HCM Signalized Intersection Capacity Analysis
62: Road "B" South & Road "C"

Sutter Pointe EIR
Cumulative Plus Project With PP PM

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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1843		1770	1863	1583	1770	3274		1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	1843		1770	1863	1583	1770	3274		1770	3539	1583
Volume (vph)	270	130	10	10	40	160	10	10	10	210	10	230
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	278	134	10	10	41	165	10	10	10	216	10	237
RTOR Reduction (vph)	0	3	0	0	0	138	0	8	0	0	0	152
Lane Group Flow (vph)	278	141	0	10	41	27	10	12	0	216	10	85
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	12.6	22.0		0.5	9.9	9.9	0.5	11.7		10.5	21.7	21.7
Effective Green, g (s)	12.6	22.0		0.5	9.9	9.9	0.5	11.7		10.5	21.7	21.7
Actuated g/C Ratio	0.21	0.36		0.01	0.16	0.16	0.01	0.19		0.17	0.36	0.36
Clearance Time (s)	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
Lane Grp Cap (vph)	367	668		15	304	258	15	631		306	1265	566
v/s Ratio Prot	c0.16	c0.08		0.01	0.02		0.01	0.00		c0.12	0.00	
v/s Ratio Perm						0.02						c0.05
v/c Ratio	0.76	0.21		0.67	0.13	0.10	0.67	0.02		0.71	0.01	0.15
Uniform Delay, d1	22.6	13.4		30.0	21.7	21.6	30.0	19.8		23.6	12.6	13.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.7	0.2		75.9	0.2	0.2	75.9	0.0		7.2	0.0	0.1
Delay (s)	31.3	13.5		105.9	21.9	21.8	105.9	19.9		30.9	12.6	13.4
Level of Service	C	B		F	C	C	F	B		C	B	B
Approach Delay (s)		25.2			25.7			48.5			21.5	
Approach LOS		C			C			D			C	

Intersection Summary













HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.6%	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)	10	50	40	340	450	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	10	52	41	351	464	10
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	41				113	41
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	41				113	41
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				47	99
cM capacity (veh/h)	1568				877	1030
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	10	52	41	351	464	10
Volume Left	10	0	0	0	464	0
Volume Right	0	0	0	351	0	10
cSH	1568	1700	1700	1700	877	1030
Volume to Capacity	0.01	0.03	0.02	0.21	0.53	0.01
Queue Length 95th (ft)	0	0	0	0	79	1
Control Delay (s)	7.3	0.0	0.0	0.0	13.6	8.5
Lane LOS	A				B	A
Approach Delay (s)	1.2		0.0		13.5	
Approach LOS					B	
Intersection Summary						
Average Delay			7.0			
Intersection Capacity Utilization			38.8%		ICU Level of Service	A
Analysis Period (min)			15			













HCM Signalized Intersection Capacity Analysis
64: Elverta Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP PM

													
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	
Lane Util. Factor		0.95	1.00		1.00	1.00				1.00		1.00	
Frt		1.00	0.85		1.00	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		3539	1583		1863	1583				1770		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		3539	1583		1863	1583				1770		1583	
Volume (vph)	0	580	330	0	410	360	0	0	0	510	0	70	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	598	340	0	423	371	0	0	0	526	0	72	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	45	
Lane Group Flow (vph)	0	598	340	0	423	371	0	0	0	526	0	27	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					8			
Permitted Phases			Free			Free						8	
Actuated Green, G (s)		23.2	49.8		23.2	49.8				18.6		18.6	
Effective Green, g (s)		23.2	49.8		23.2	49.8				18.6		18.6	
Actuated g/C Ratio		0.47	1.00		0.47	1.00				0.37		0.37	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		1649	1583		868	1583				661		591	
v/s Ratio Prot		0.17			c0.23					c0.30			
v/s Ratio Perm			0.21			0.23						0.02	
v/c Ratio		0.36	0.21		0.49	0.23				0.80		0.05	
Uniform Delay, d1		8.5	0.0		9.2	0.0				13.9		9.9	
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.1	0.3		2.0	0.3				6.6		0.0	
Delay (s)		8.7	0.3		11.1	0.3				20.5		10.0	
Level of Service		A	A		B	A				C		A	
Approach Delay (s)		5.6			6.1			0.0			19.2		
Approach LOS		A			A			A			B		
Intersection Summary													
HCM Average Control Delay			9.3									HCM Level of Service	A
HCM Volume to Capacity ratio			0.62										
Actuated Cycle Length (s)			49.8									Sum of lost time (s)	8.0
Intersection Capacity Utilization			56.5%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												

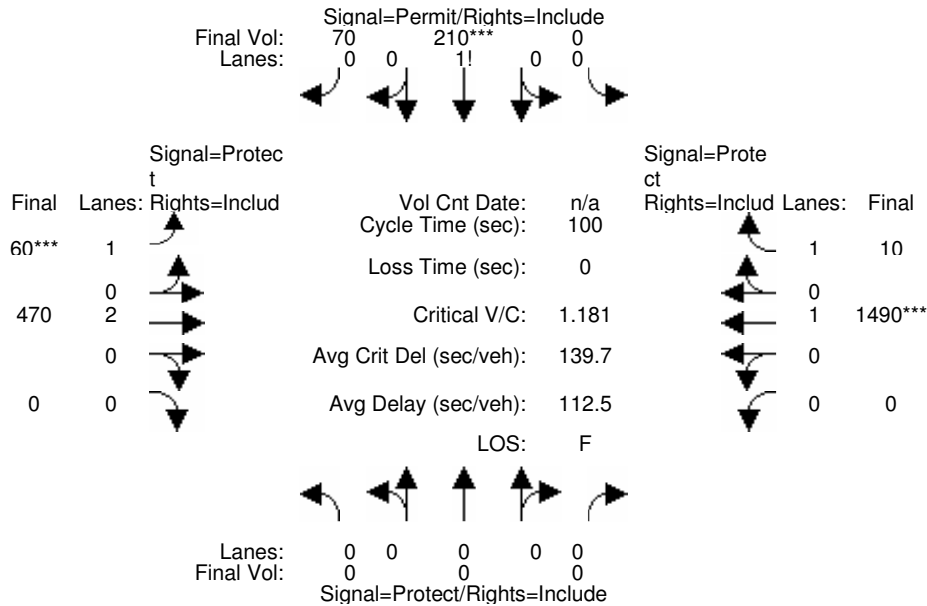
HCM Signalized Intersection Capacity Analysis
65: Elverta Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP PM

												
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	1.00		0.95	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		3539	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		3539	1583	1770		1583			
Volume (vph)	0	820	270	0	560	150	210	0	630	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	845	278	0	577	155	216	0	649	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	845	278	0	577	155	216	0	649	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		43.6	64.5		43.6	64.5	12.9		64.5			
Effective Green, g (s)		43.6	64.5		43.6	64.5	12.9		64.5			
Actuated g/C Ratio		0.68	1.00		0.68	1.00	0.20		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		1259	1583		2392	1583	354		1583			
v/s Ratio Prot		c0.45			0.16		c0.12					
v/s Ratio Perm			0.18			0.10			0.41			
v/c Ratio		0.67	0.18		0.24	0.10	0.61		0.41			
Uniform Delay, d1		6.2	0.0		4.0	0.0	23.5		0.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		2.9	0.2		0.1	0.1	3.1		0.8			
Delay (s)		9.1	0.2		4.1	0.1	26.6		0.8			
Level of Service		A	A		A	A	C		A			
Approach Delay (s)		6.9			3.3			7.2			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			6.0				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			64.5				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			61.5%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP AM

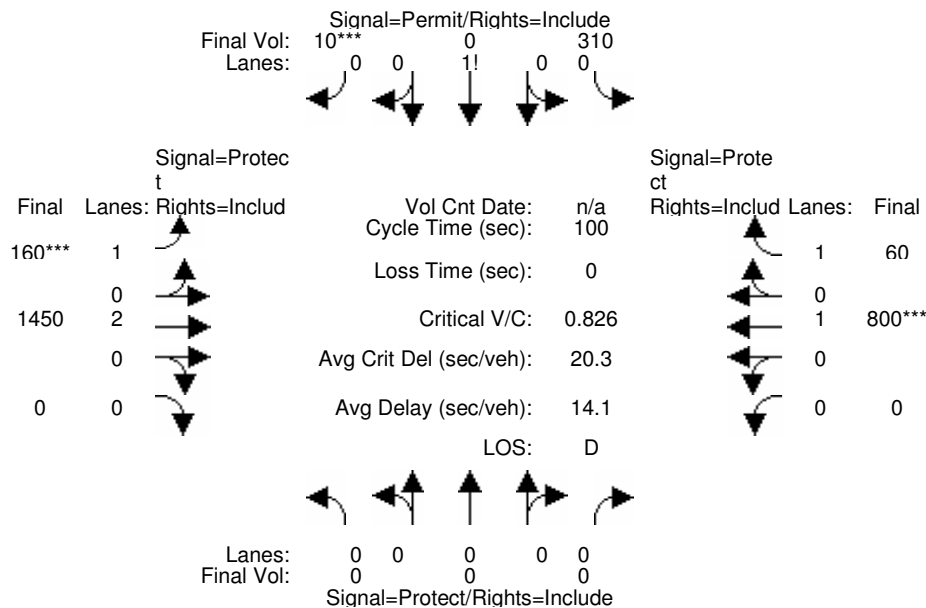
Intersection #17: Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	0	210	70	60	470	0	0	1490	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	210	70	60	470	0	0	1490	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	0	210	70	60	470	0	0	1490	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	210	70	60	470	0	0	1490	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	210	70	60	470	0	0	1490	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	0	210	70	60	470	0	0	1490	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.00	0.75	0.25	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	0	1163	388	1550	3100	0	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.18	0.18	0.04	0.15	0.00	0.00	0.96	0.01
Crit Volume:	0				280		60				1490	
Crit Moves:				****			****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP PM

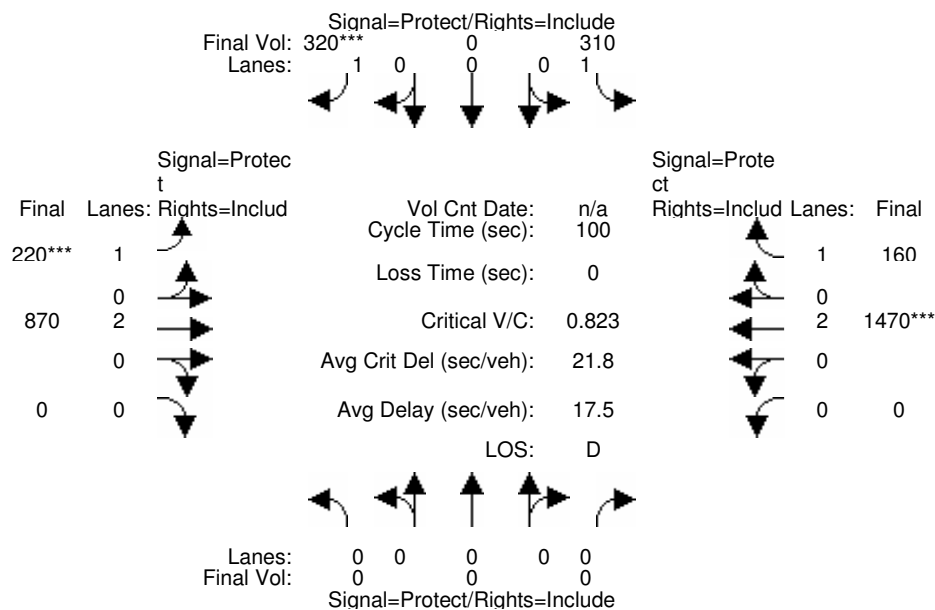
Intersection #17: Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	310	0	10	160	1450	0	0	800	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	310	0	10	160	1450	0	0	800	60
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	310	0	10	160	1450	0	0	800	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	310	0	10	160	1450	0	0	800	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	310	0	10	160	1450	0	0	800	60
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	310	0	10	160	1450	0	0	800	60
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.97	0.00	0.03	1.00	2.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1502	0	48	1550	3100	0	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.21	0.00	0.21	0.10	0.47	0.00	0.00	0.52	0.04
Crit Volume:	0					320	160			800		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP AM

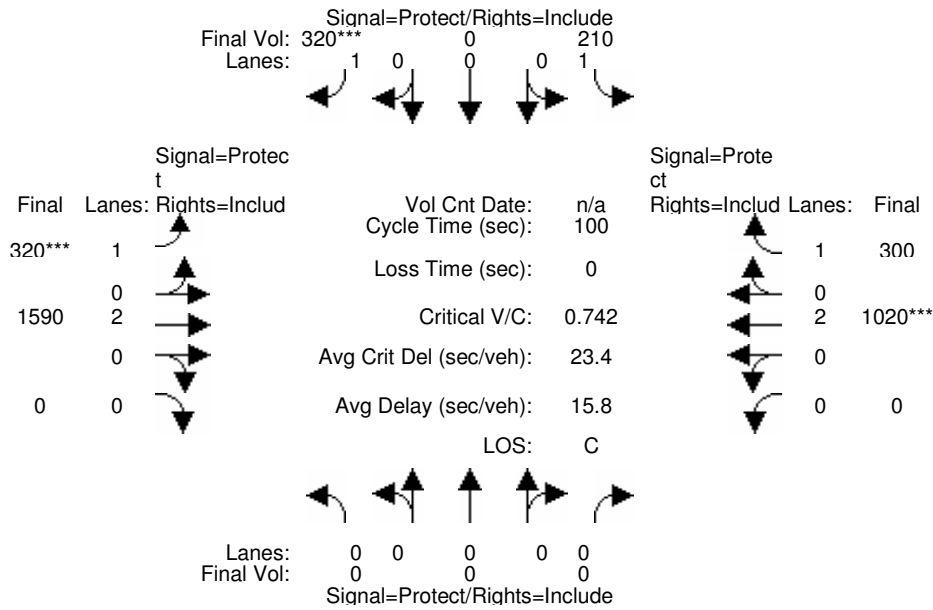
Intersection #18: Elverta Road / Palladay Road



Street Name:	Palladay Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	310	0	320	220	870	0	0	1470	160
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	310	0	320	220	870	0	0	1470	160
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	310	0	320	220	870	0	0	1470	160
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	310	0	320	220	870	0	0	1470	160
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	310	0	320	220	870	0	0	1470	160
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	310	0	320	220	870	0	0	1470	160
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.20	0.00	0.21	0.14	0.28	0.00	0.00	0.47	0.10
Crit Volume:	0					320	220				735	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP PM

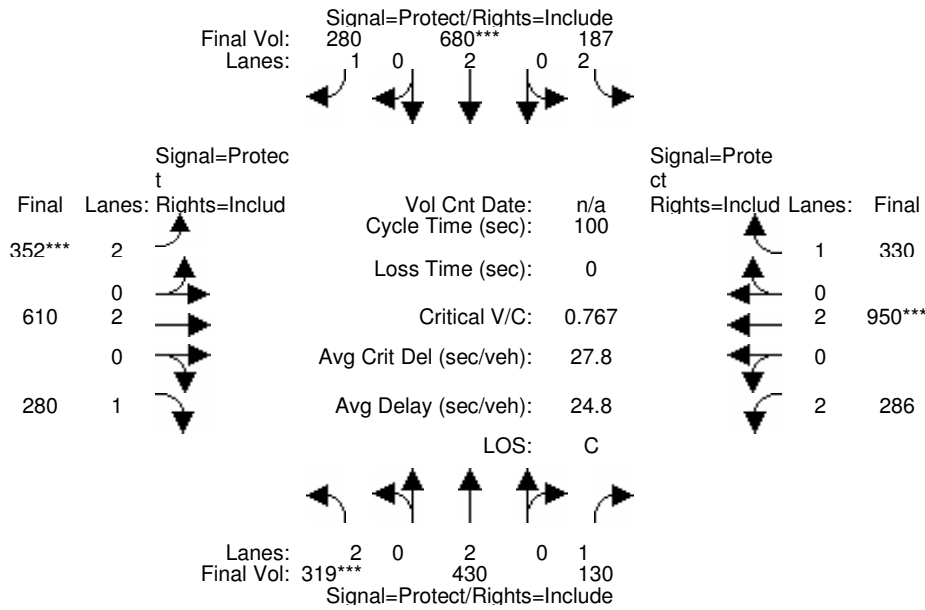
Intersection #18: Elverta Road / Palladay Road



Street Name:	Palladay Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	210	0	320	320	1590	0	0	1020	300
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	210	0	320	320	1590	0	0	1020	300
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	210	0	320	320	1590	0	0	1020	300
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	210	0	320	320	1590	0	0	1020	300
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	210	0	320	320	1590	0	0	1020	300
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	210	0	320	320	1590	0	0	1020	300
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.14	0.00	0.21	0.21	0.51	0.00	0.00	0.33	0.19
Crit Volume:	0					320	320				510	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP AM

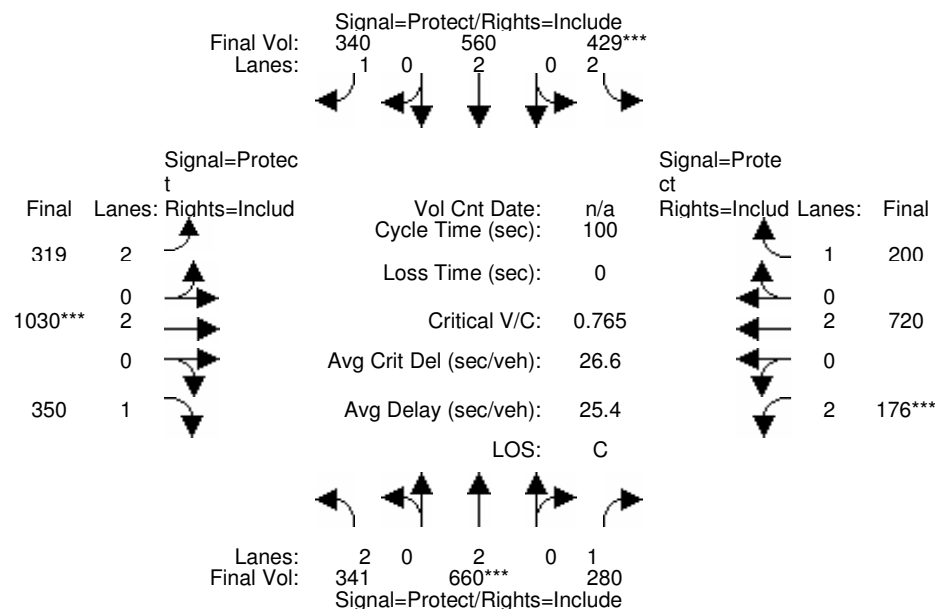
Intersection #19: Elverta Road / 16th Street



Street Name:	16th Street						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	290	430	130	170	680	280	320	610	280	260	950	330
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	290	430	130	170	680	280	320	610	280	260	950	330
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	290	430	130	170	680	280	320	610	280	260	950	330
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	290	430	130	170	680	280	320	610	280	260	950	330
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	290	430	130	170	680	280	320	610	280	260	950	330
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	319	430	130	187	680	280	352	610	280	286	950	330
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	3000	1500	3000	3000	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.11	0.14	0.09	0.06	0.23	0.19	0.12	0.20	0.19	0.10	0.32	0.22
Crit Volume:	160			340			176			475		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

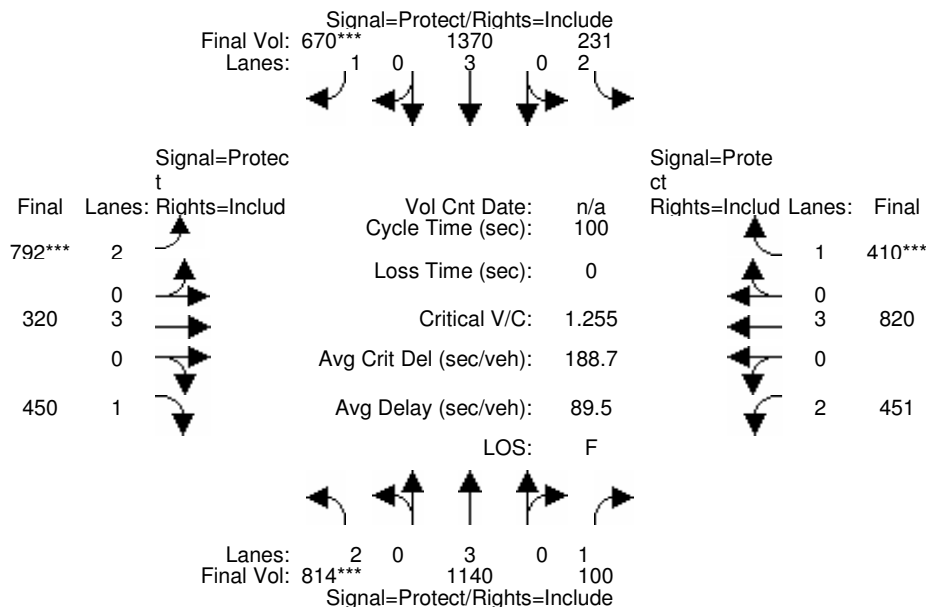
Intersection #19: Elverta Road / 16th Street



Street Name:	16th Street						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	310	660	280	390	560	340	290	1030	350	160	720	200
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	310	660	280	390	560	340	290	1030	350	160	720	200
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	310	660	280	390	560	340	290	1030	350	160	720	200
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	310	660	280	390	560	340	290	1030	350	160	720	200
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	310	660	280	390	560	340	290	1030	350	160	720	200
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	341	660	280	429	560	340	319	1030	350	176	720	200
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	3000	3000	1500	3000	3000	1500	3000	3000	1500	3000	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.11	0.22	0.19	0.14	0.19	0.23	0.11	0.34	0.23	0.06	0.24	0.13
Crit Volume:	330			214			515			88		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP AM

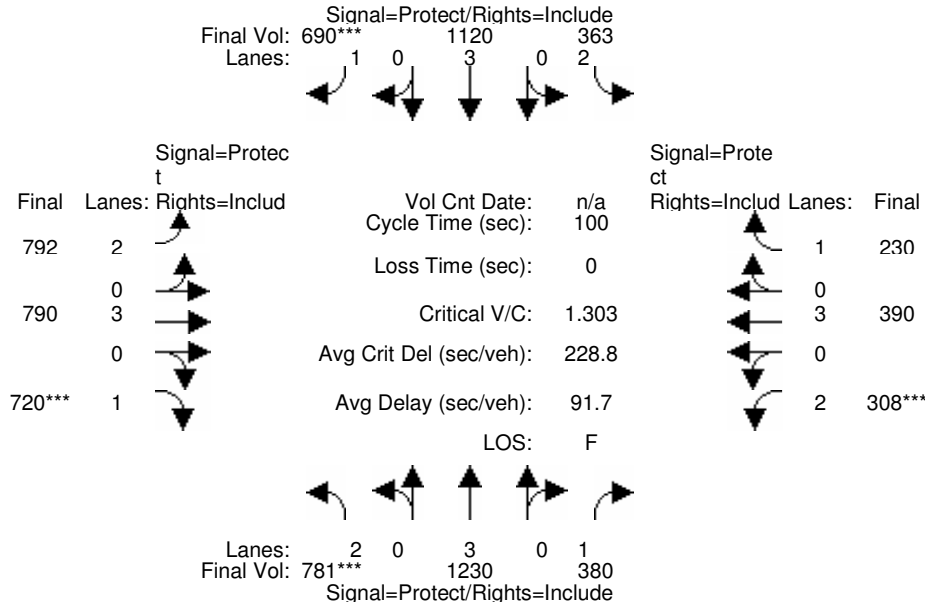
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	740	1140	100	210	1370	670	720	320	450	410	820	410
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	740	1140	100	210	1370	670	720	320	450	410	820	410
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	740	1140	100	210	1370	670	720	320	450	410	820	410
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	740	1140	100	210	1370	670	720	320	450	410	820	410
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	740	1140	100	210	1370	670	720	320	450	410	820	410
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	814	1140	100	231	1370	670	792	320	450	451	820	410
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.27	0.25	0.07	0.08	0.30	0.45	0.26	0.07	0.30	0.15	0.18	0.27
Crit Volume:	407					670	396					410
Crit Moves:	****					****	****					****

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

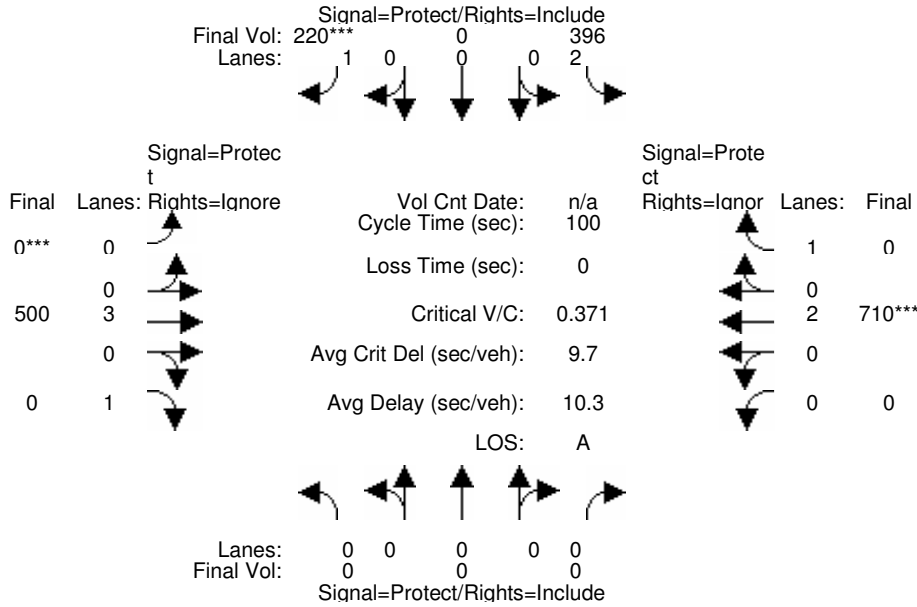
Intersection #20: Elverta Road / Watt Avenue



Street Name:	Watt Avenue						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	710	1230	380	330	1120	690	720	790	720	280	390	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	710	1230	380	330	1120	690	720	790	720	280	390	230
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	710	1230	380	330	1120	690	720	790	720	280	390	230
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	710	1230	380	330	1120	690	720	790	720	280	390	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	710	1230	380	330	1120	690	720	790	720	280	390	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	781	1230	380	363	1120	690	792	790	720	308	390	230
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.26	0.27	0.25	0.12	0.25	0.46	0.26	0.18	0.48	0.10	0.09	0.15
Crit Volume:	391					690			720	154		
Crit Moves:	****					****			****	****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP AM

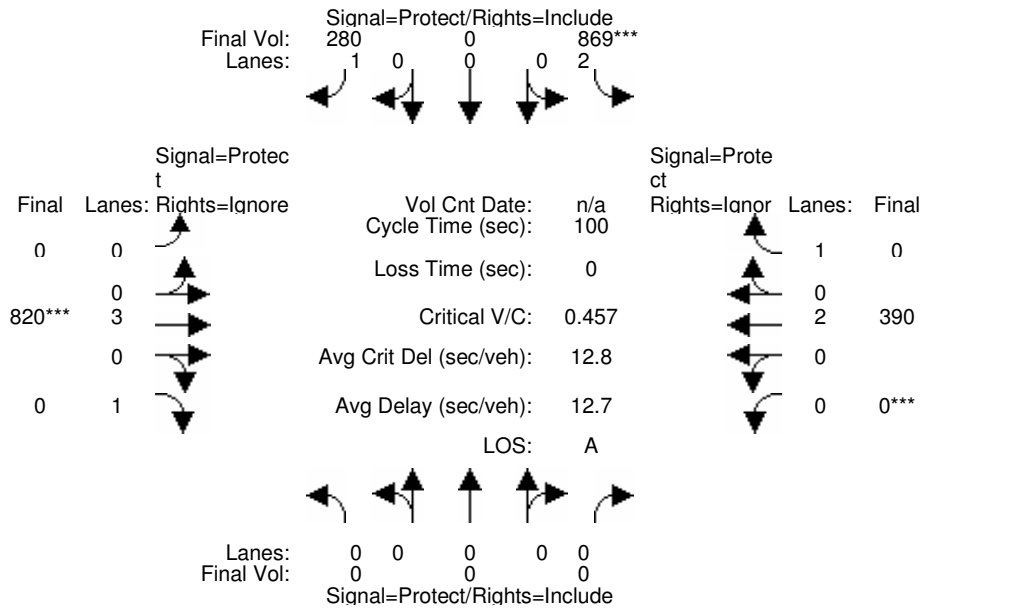
Intersection #21: Elkhorn Boulevard / SR 70 / SR99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	360	0	220	0	500	170	0	710	960
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	360	0	220	0	500	170	0	710	960
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	360	0	220	0	500	170	0	710	960
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	360	0	220	0	500	0	0	710	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	360	0	220	0	500	0	0	710	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	396	0	220	0	500	0	0	710	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	0	3100	0	1550	0	4650	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.13	0.00	0.14	0.00	0.11	0.00	0.00	0.23	0.00
Crit Volume:	0					220	0			355		
Crit Moves:						****	****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

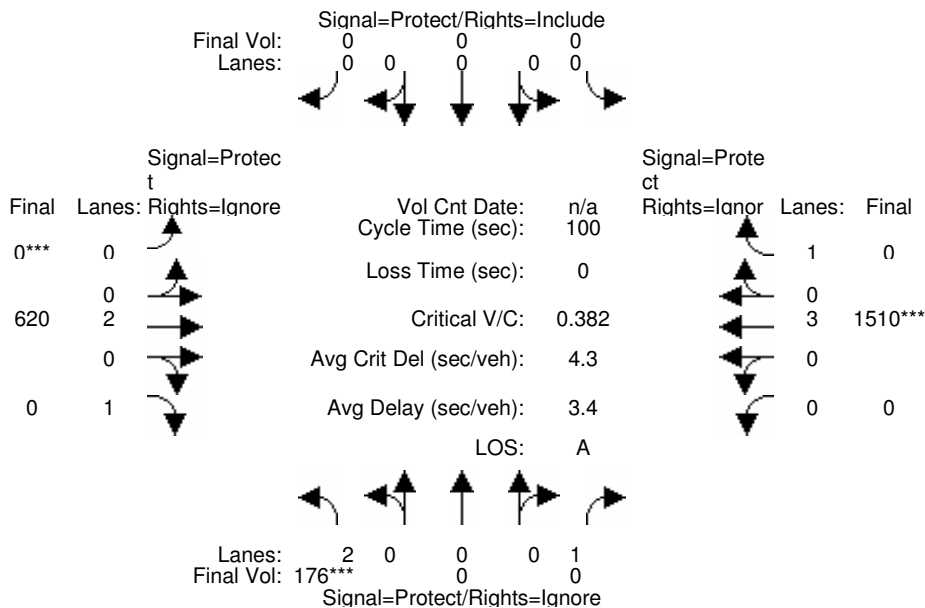
Intersection #21: Elkhorn Boulevard / SR 70 / SR99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	790	0	280	0	820	110	0	390	370
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	790	0	280	0	820	110	0	390	370
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	790	0	280	0	820	110	0	390	370
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	790	0	280	0	820	0	0	390	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	790	0	280	0	820	0	0	390	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	869	0	280	0	820	0	0	390	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	2.00	0.00	1.00	0.00	3.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	0	3100	0	1550	0	4650	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.28	0.00	0.18	0.00	0.18	0.00	0.00	0.13	0.00
Crit Volume:	0			435			273			0		
Crit Moves:				****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP AM

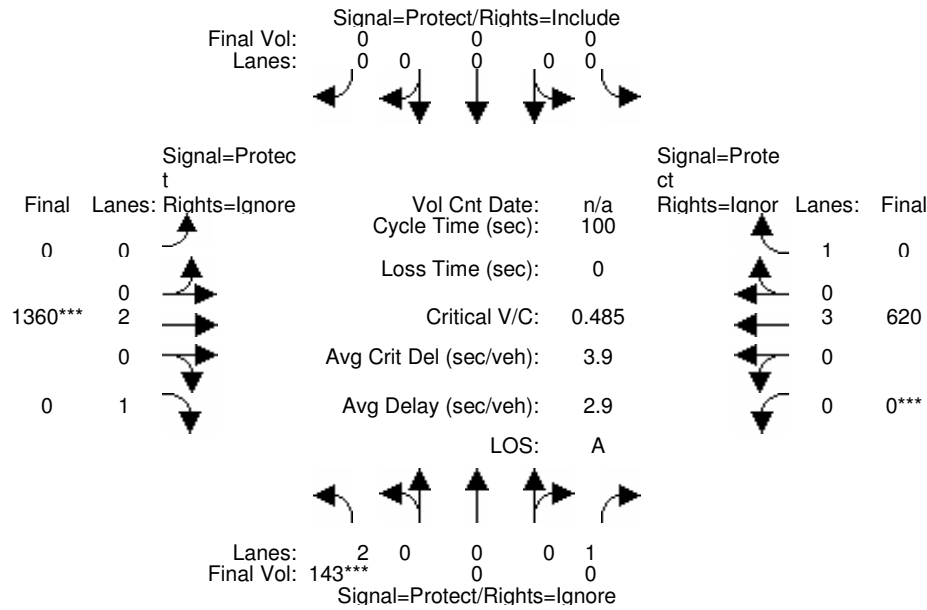
Intersection #22: Elkhorn Boulevard / SR 70 / SR 99 NB Ramps



Street Name:	SR 70 / SR 99 NB Ramps						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	160	0	420	0	0	0	0	620	240	0	1510	710
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	160	0	420	0	0	0	0	620	240	0	1510	710
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	160	0	420	0	0	0	0	620	240	0	1510	710
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	160	0	0	0	0	0	0	620	0	0	1510	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	160	0	0	0	0	0	0	620	0	0	1510	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.10	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	176	0	0	0	0	0	0	620	0	0	1510	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	3.00	1.00
Final Sat.:	3100	0	1550	0	0	0	0	3100	1550	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.32	0.00
Crit Volume:	88										503	
Crit Moves:	****										****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

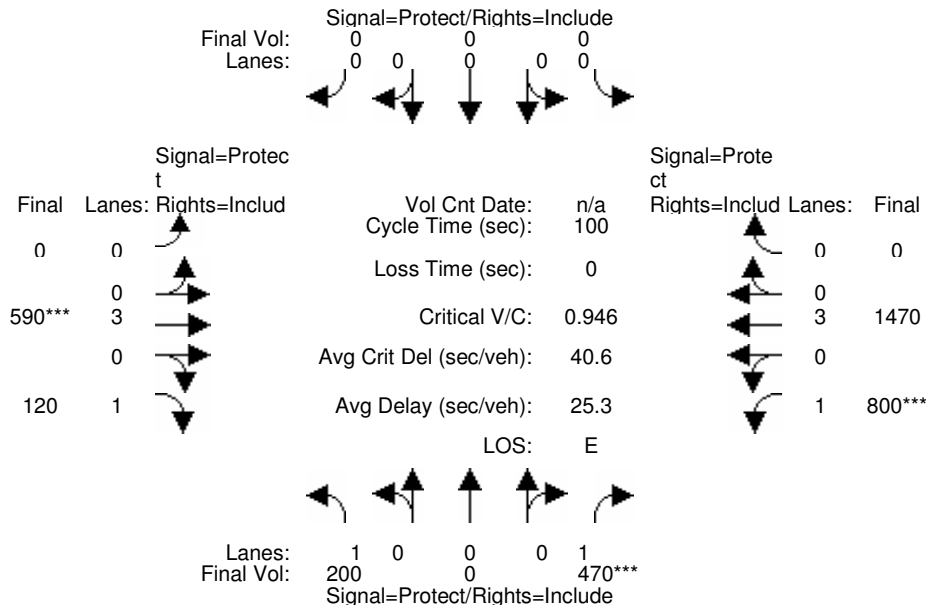
Intersection #22: Elkhorn Boulevard / SR 70 / SR 99 NB Ramps



Street Name:	SR 70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	130	0	1450	0	0	0	0	1360	250	0	620	480
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	130	0	1450	0	0	0	0	1360	250	0	620	480
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	130	0	1450	0	0	0	0	1360	250	0	620	480
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	130	0	0	0	0	0	0	1360	0	0	620	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	130	0	0	0	0	0	0	1360	0	0	620	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.10	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	143	0	0	0	0	0	0	1360	0	0	620	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	3.00	1.00
Final Sat.:	3100	0	1550	0	0	0	0	3100	1550	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.13	0.00
Crit Volume:	72							680				
Crit Moves:	****							****			****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP AM

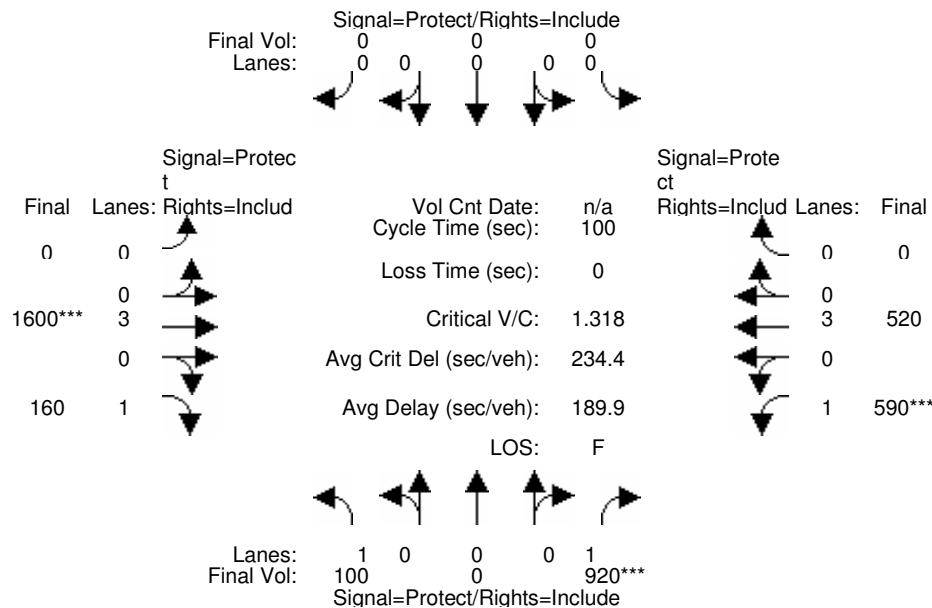
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	200	0	470	0	0	0	0	590	120	800	1470	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	200	0	470	0	0	0	0	590	120	800	1470	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	200	0	470	0	0	0	0	590	120	800	1470	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	200	0	470	0	0	0	0	590	120	800	1470	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	200	0	470	0	0	0	0	590	120	800	1470	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	200	0	470	0	0	0	0	590	120	800	1470	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	1550	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.13	0.00	0.30	0.00	0.00	0.00	0.00	0.13	0.08	0.52	0.32	0.00
Crit Volume:			470	0				197		800		
Crit Moves:			***					***		***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

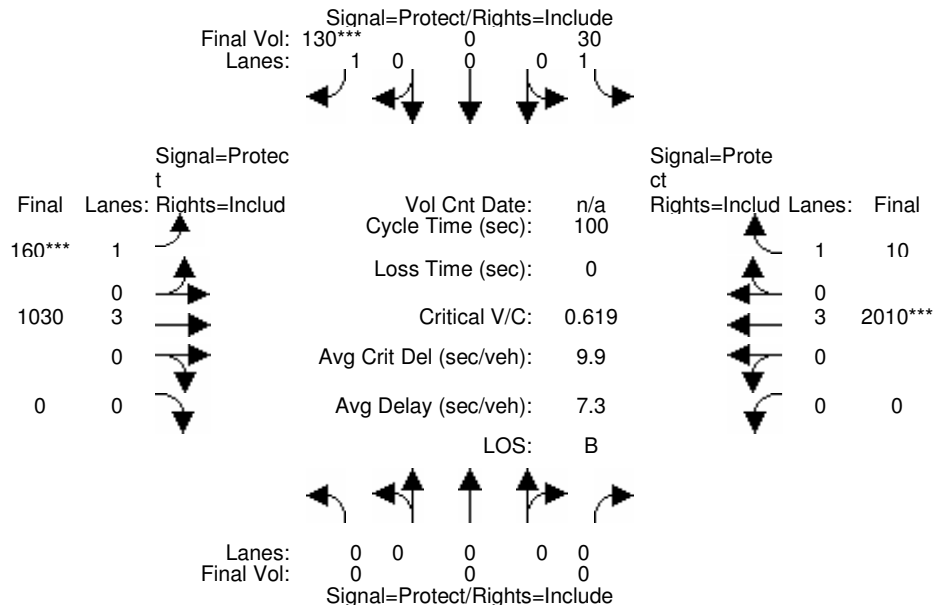
Intersection #23: Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	100	0	920	0	0	0	0	1600	160	590	520	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	100	0	920	0	0	0	0	1600	160	590	520	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	100	0	920	0	0	0	0	1600	160	590	520	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	100	0	920	0	0	0	0	1600	160	590	520	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	100	0	920	0	0	0	0	1600	160	590	520	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	100	0	920	0	0	0	0	1600	160	590	520	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	1.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	1550	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.59	0.00	0.00	0.00	0.00	0.34	0.10	0.38	0.11	0.00
Crit Volume:			920	0				533		590		
Crit Moves:			***					***		***		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP AM

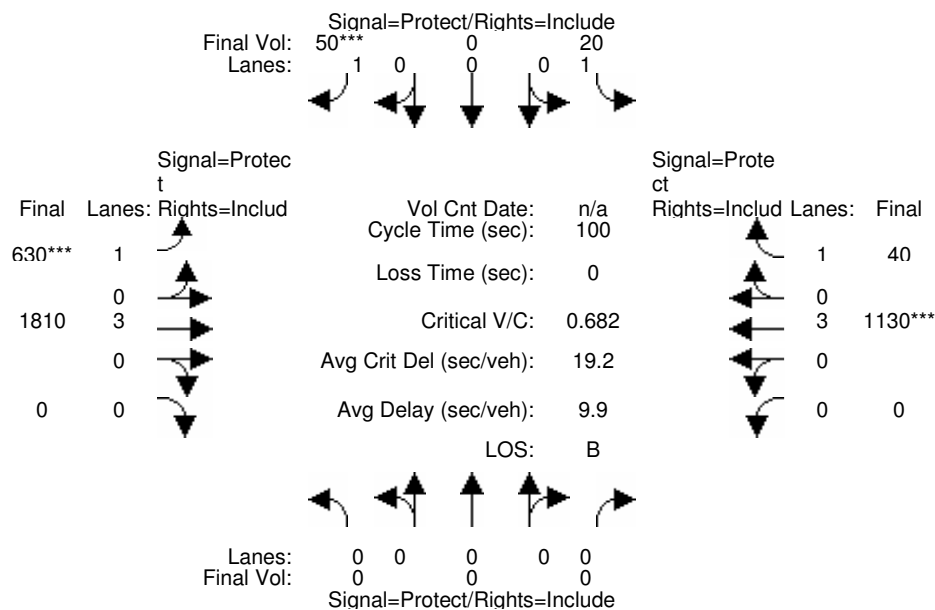
Intersection #24: Elk Horn Boulevard / East Levee Road



Street Name:	East Levee Road						Elk Horn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	30	0	130	160	1030	0	0	2010	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	30	0	130	160	1030	0	0	2010	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	30	0	130	160	1030	0	0	2010	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	30	0	130	160	1030	0	0	2010	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	30	0	130	160	1030	0	0	2010	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	30	0	130	160	1030	0	0	2010	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	4650	0	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.08	0.10	0.22	0.00	0.00	0.43	0.01
Crit Volume:	0					130	160				670	
Crit Moves:						****	****				****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

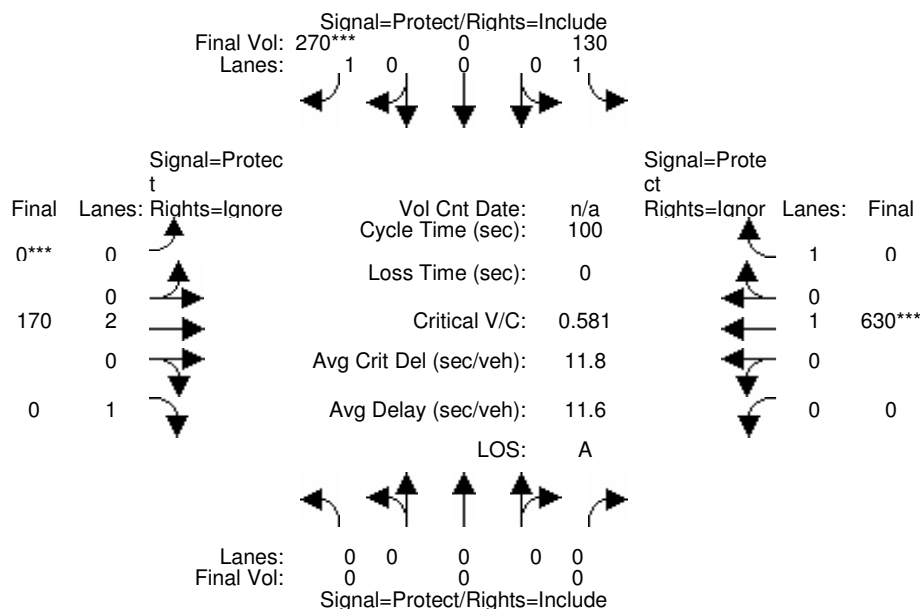
Intersection #24: Elk Horn Boulevard / East Levee Road



Street Name:	East Levee Road						Elk Horn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	20	0	50	630	1810	0	0	1130	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	20	0	50	630	1810	0	0	1130	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	20	0	50	630	1810	0	0	1130	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	20	0	50	630	1810	0	0	1130	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	20	0	50	630	1810	0	0	1130	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	20	0	50	630	1810	0	0	1130	40
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	3.00	0.00	0.00	3.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	4650	0	0	4650	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.01	0.00	0.03	0.41	0.39	0.00	0.00	0.24	0.03
Crit Volume:	0					50	630				377	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP AM

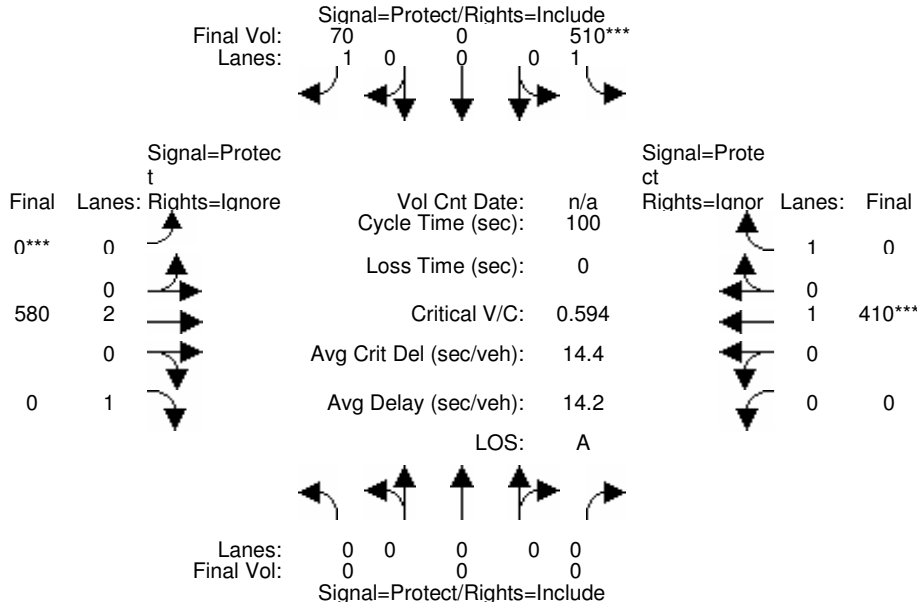
Intersection #64:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	130	0	270	0	170	110	0	630	610
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	130	0	270	0	170	110	0	630	610
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	130	0	270	0	170	110	0	630	610
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	130	0	270	0	170	0	0	630	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	130	0	270	0	170	0	0	630	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	130	0	270	0	170	0	0	630	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	3100	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.08	0.00	0.17	0.00	0.05	0.00	0.00	0.41	0.00
Crit Volume:	0					270	0			630		
Crit Moves:				****		****				****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

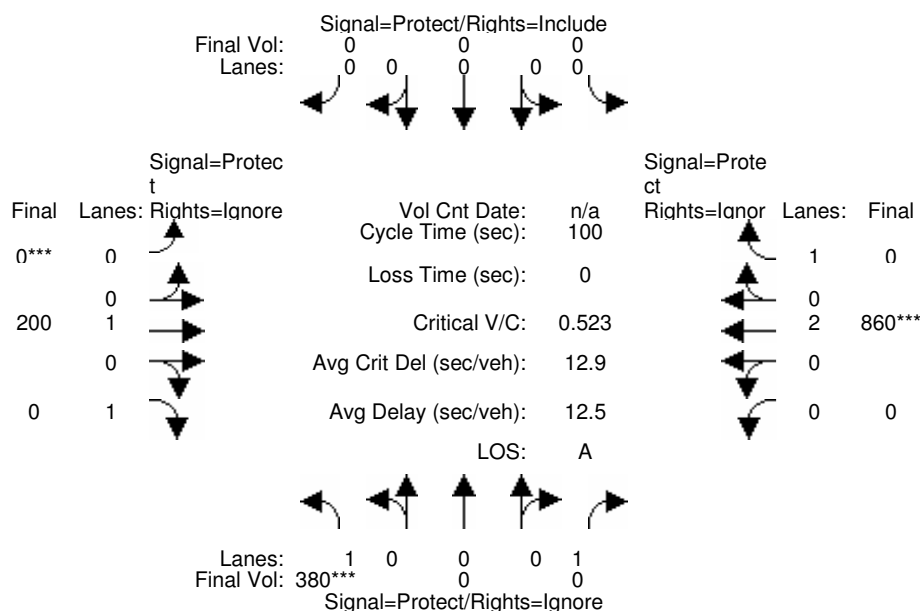
Intersection #64:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	510	0	70	0	580	330	0	410	360
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	510	0	70	0	580	330	0	410	360
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	510	0	70	0	580	330	0	410	360
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	510	0	70	0	580	0	0	410	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	510	0	70	0	580	0	0	410	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	510	0	70	0	580	0	0	410	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	3100	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.33	0.00	0.05	0.00	0.19	0.00	0.00	0.26	0.00
Crit Volume:	0			510			0			410		
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP AM

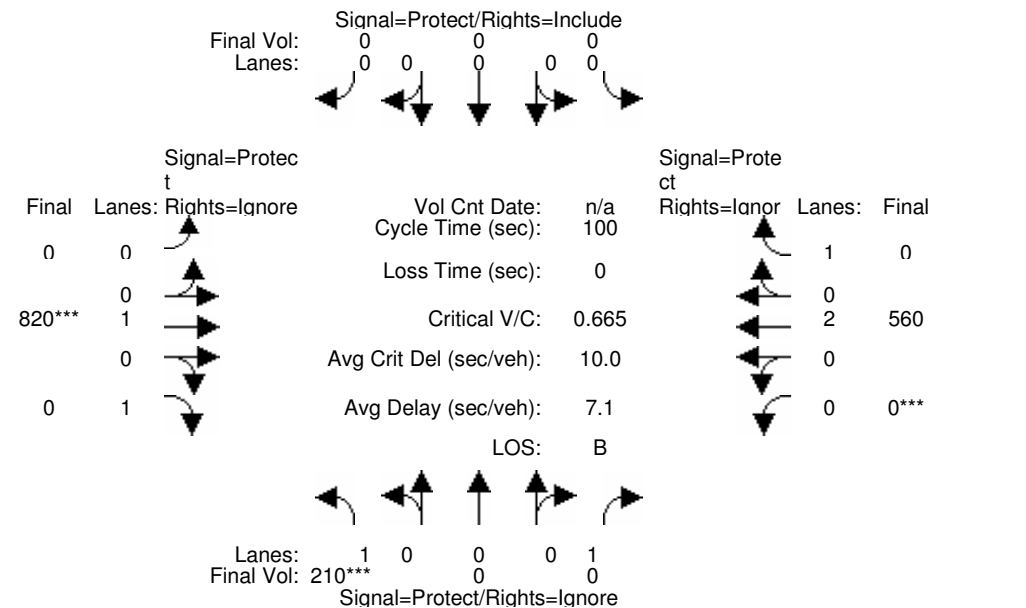
Intersection #65:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	380	0	190	0	0	0	0	200	100	0	860	320
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	380	0	190	0	0	0	0	200	100	0	860	320
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	380	0	190	0	0	0	0	200	100	0	860	320
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	380	0	0	0	0	0	0	200	0	0	860	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	380	0	0	0	0	0	0	200	0	0	860	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	380	0	0	0	0	0	0	200	0	0	860	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.28	0.00
Crit Volume:	380				0			0			430	
Crit Moves:	****						****				****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

Intersection #65:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	210	0	630	0	0	0	0	820	270	0	560	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	210	0	630	0	0	0	0	820	270	0	560	150
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	210	0	630	0	0	0	0	820	270	0	560	150
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	210	0	0	0	0	0	0	820	0	0	560	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	210	0	0	0	0	0	0	820	0	0	560	0
PCE Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	210	0	0	0	0	0	0	820	0	0	560	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	2.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.18	0.00
Crit Volume:	210							820			0	
Crit Moves:	****							****			****	

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 6970 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 710 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	6970	710	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1894	193	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8523	791	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 4970$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	9314	7050	Yes
v/v	3553 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v/v > 2700$ pc/h?		Yes	
3 or av34			
Is $v/v > 1.5 v/2$	No		
3 or av34	12		
If yes, v = 5823		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	5823	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 55.4$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 3.210
S
Space mean speed in ramp influence area, S = -8.8 mph
R
Space mean speed in outer lanes, S = 56.1 mph
O
Space mean speed for all vehicles, S = mph

Average passenger-car speed, S 56.0 mi/h
 Number of lanes, N 2
 Density, D 40.0 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3660 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 995 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2238 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2238 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 60.4 mi/h
 Number of lanes, N 2
 Density, D 34.1 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3645 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 990 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2060 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2060 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7870 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	7870	1170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	2139	318	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8897	1304	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 4615$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	8897	9400	No
Fi F			
v = v - v	7593	9400	No
FO F R			
v	1304	2100	No
R			
v v	2141 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4615	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 39.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, D = 0.415
S
Space mean speed in ramp influence area, S = 55.4 mph
R
Space mean speed in outer lanes, S = 66.9 mph
0
Space mean speed for all vehicles, S = 60.4 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4870 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4870	580	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1323	158	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5955		646		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5955$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5955	4700	Yes
Fi F			
$v = v - v$	5309	4700	Yes
FO F R			
v	646	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5955	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 52.8$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.356$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4290 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 240 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4290	240	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1166	65	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5246	267	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5246$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5513 4700 Yes
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5246	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 45.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.263
S
Space mean speed in ramp influence area, S = 36.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 36.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4530 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	710 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4530	710	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1231	193	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5539	791	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5539 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6330	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5539	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 51.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.465
S
Space mean speed in ramp influence area, S = 8.3 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 8.3 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5240 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5240	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1424	155	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6408	635	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6408$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6408	4700	Yes
Fi F			
$v = v - v$	5773	4700	Yes
FO F R			
v	635	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	6408	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 56.7$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4670 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 100 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4670	100	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1269	27	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5711	111	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5711$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5822	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5711	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 47.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.613
S
Space mean speed in ramp influence area, S = 27.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 27.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4770 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	320 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4770	320	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1296	87	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5833	357	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5833 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6190	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5833	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 50.5 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.179
S
Space mean speed in ramp influence area, S = 14.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 14.9 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 20.6 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2190 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 595 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1339 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1339 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Placer Parkway Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2190 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 960 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2190	960	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	595	261	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2678	1070	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2678$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2678	4700	No
Fi F			
$v = v - v$	1608	4700	No
FO F R			
v	1070	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2678	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 24.6$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.394$
S
Space mean speed in ramp influence area, $S = 55.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Placer Parkway On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	1230 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	140 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	1230	140	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	334	38	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1504	156	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 1504 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1660	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1504	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.2 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.297
S
Space mean speed in ramp influence area, S = 58.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.2 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 372 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 838 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 838 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.5 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2700 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 734 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1526 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1526 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Placer Parkway Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2700 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 430 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2700	430	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	734	117	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3052		479		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3052$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3052	4700	No
Fi F			
$v = v - v$	2573	4700	No
FO F R			
v	479	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3052	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 27.8$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.341$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Placer Parkway On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2270 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 1820 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2270	1820	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	617	495	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2566	2028	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 2566 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4594	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2566	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.2 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.662
S
Space mean speed in ramp influence area, S = 49.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 49.8 mph

Average passenger-car speed, S 53.6 mi/h
 Number of lanes, N 2
 Density, D 43.2 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4090 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1111 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2312 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2312 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4690 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 400 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4690	400	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1274	109	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5302		446		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5302$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5302	4700	Yes
Fi F			
$v = v - v$	4856	4700	Yes
FO F R			
v	446	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5302	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 47.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.338$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4290 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 610 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4290	610	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1166	166	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4850	680	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4850 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5530	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4850	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 45.2 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.279
S
Space mean speed in ramp influence area, S = 35.6 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 35.6 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4900 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 110 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4900	110	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1332	30	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5539	123	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5539 pc/h
12 F FM

Capacity Checks

v Actual Maximum LOS F?
FO 5662 4700 Yes
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5539	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 46.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.398
S
Space mean speed in ramp influence area, S = 32.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 32.8 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5010 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 580 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5010	580	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1361	158	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5663		646		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5663$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5663	4700	Yes
Fi F			
$v = v - v$	5017	4700	Yes
FO F R			
v	646	4100	No
R			
$v v$	0	pc/h (Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5663	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 35.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.356$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4430 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 960 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4430	960	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1204	261	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5008	1070	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5008$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6078	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5008	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 49.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.997
S
Space mean speed in ramp influence area, S = 19.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 19.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5390 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5390	170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1465	46	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6093	189	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 6093$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6282	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	6093	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 51.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.362
S
Space mean speed in ramp influence area, S = 10.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 10.7 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.1 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak
 Freeway/Direction: Placer Parkway EB
 From/To: SR 99 to Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1390 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 378 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 786 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 786 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: Placer Parkway EB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1390 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 690 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1390	690	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	378	187	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	1571		769		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1571$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1571	4700	No
Fi F			
$v = v - v$	802	4700	No
FO F R			
v	769	2100	No
R			
$v v$	0	pc/h	(Equation 25-15 or 25-16)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1571	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 8.8$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, $D = 0.367$
S
Space mean speed in ramp influence area, $S = 56.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: Placer Parkway EB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	700 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	630 vph
Length of first accel/decel lane	1000 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	700	630	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	190	171	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	791	702	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 791 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1493	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	791	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.5 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.248
S
Space mean speed in ramp influence area, S = 59.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 59.3 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 11.6 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak
 Freeway/Direction: Placer Parkway EB
 From/To: East of Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1330 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 361 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 752 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 752 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.9 mi/h
 Number of lanes, N 2
 Density, D 24.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak
 Freeway/Direction: Placer Parkway WB
 From/To: East of Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2790 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 758 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1577 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1577 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: Placer Parkway WB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2790 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1310 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2790	1310	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	758	356	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3154	1460	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3154$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3154	4700	No
Fi F			
$v = v - v$	1694	4700	No
FO F R			
v	1460	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3154	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 22.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.429$
S
Space mean speed in ramp influence area, $S = 55.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: Placer Parkway WB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	1480 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	480 vph
Length of first accel/decel lane	1000 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1480	480	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	402	130	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1673	535	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1673$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2208	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1673	4400	No
			!

Level of Service Determination (if not F)

Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 16.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.266
S
Space mean speed in ramp influence area, S = 58.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.9 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 17.0 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: AM Peak
 Freeway/Direction: Placer Parkway WB
 From/To: Road C to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1960 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 533 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1108 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1108 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5560 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1335 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5560	1335	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1511	363	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6285	1487	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6285$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	6285	4700	Yes
Fi F			
v = v - v	4798	4700	Yes
FO F R			
v	1487	2200	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	6285	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 44.8$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.172$
S
Space mean speed in ramp influence area, $S = 61.0$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.0$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3660 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1335 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3660	1335	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	995	363	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4476	1487	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4476$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5963	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4476	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 41.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.642
S
Space mean speed in ramp influence area, S = 27.2 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 27.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4495 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 850 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4495	850	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1221	231	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 5081 947 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5081$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5081	4700	Yes
Fi F			
$v = v - v$	4134	4700	No
FO F R			
v	947	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5081	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 34.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.123$
S
Space mean speed in ramp influence area, $S = 62.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4020 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	850 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4020	850	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1092	231	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4916	947	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4916 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5863	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
	3 or av34		
Is v v	> 2700 pc/h?	No	
	3 or av34		
Is v v	> 1.5 v /2	No	
	3 or av34	12	
If yes, v =		(Equation 25-8)	
	12A		

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4916	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 41.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.498
S
Space mean speed in ramp influence area, S = 30.5 mph
R
Space mean speed in outer lanes, S = N/A mph
O
Space mean speed for all vehicles, S = 30.5 mph

Leisch Method for Weaving Analysis

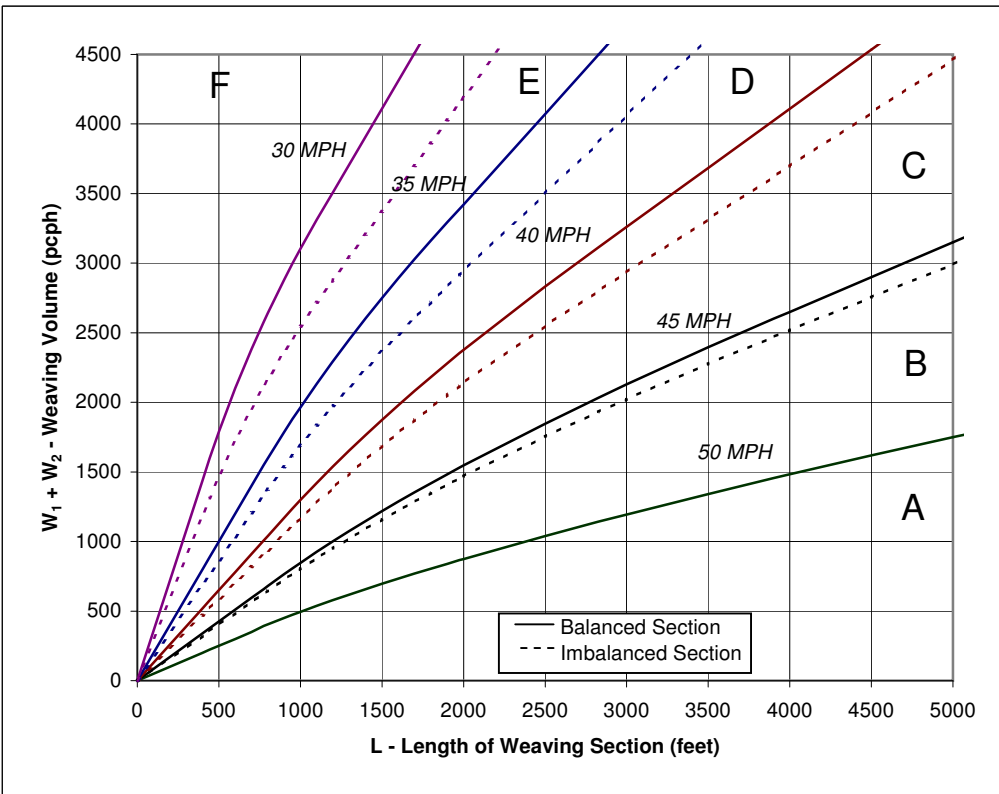
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

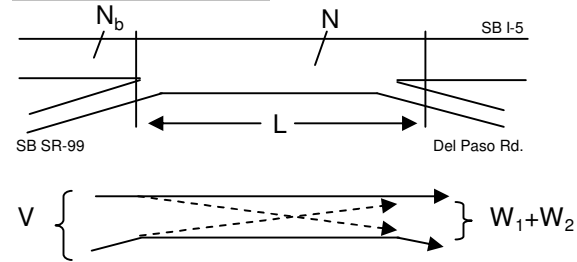
Project Information

Project	South Sutter County
Scenario	Cumulative PP WPP - AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	7,870	Volume (vph)*	4,225	Volume (vph)*	1,170
Truck Percentage	8%	Truck Percentage	5%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	8,185	Volume (pcph)	4,331	Volume (pcph)	1,199



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **16.0**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,646**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	7680	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	7680	4020
Lanes	3	2
Capacity Check	LOS F	OK

f_{HV}	0.8889
----------	--------

v_i	9391.304	pc/hr/ln
-------	----------	----------

Density, D	34.1	pc/mi/ln
-------------------	------	----------

LOS	LOS F
------------	-------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP WPP AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 8230 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 820 vph
Length of first accel/decel lane 200 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	8230	820	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	2121	211	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8824	866	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.583 Using Equation 1
FM
 $v = v(P) = 5145$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	9690	7050	Yes
$v v$	3679 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		Yes	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 6124		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	6124	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 58.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 4.537
S
Space mean speed in ramp influence area, S = -39.4 mph
R
Space mean speed in outer lanes, S = 56.1 mph
O
Space mean speed for all vehicles, S = mph

Average passenger-car speed, S 60.4 mi/h
 Number of lanes, N 2
 Density, D 34.0 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3835 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 988 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2056 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2056 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 59.9 mi/h
 Number of lanes, N 2
 Density, D 34.8 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3815 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 983 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2084 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2084 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7820 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 950 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	7820	950	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	2015	245	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8546	1004	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 4292$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	8546	9400	No
Fi F			
v = v - v	7542	9400	No
FO F R			
v	1004	2100	No
R			
v v	2127 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4292	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 36.7$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.388$
S
Space mean speed in ramp influence area, $S = 56.1$ mph
R
Space mean speed in outer lanes, $S = 66.9$ mph
0
Space mean speed for all vehicles, $S = 61.0$ mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 6380 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	6380	1580	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1644	407	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6840	1670	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6840$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6840	4700	Yes
Fi F			
$v = v - v$	5170	4700	Yes
FO F R			
v	1670	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	6840	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 60.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.448$
S
Space mean speed in ramp influence area, $S = 54.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4800 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 250 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4800	250	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1237	64	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5146	264	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5146 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5410 4700 Yes
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5146	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 44.4 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.168
S
Space mean speed in ramp influence area, S = 38.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 38.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5050 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 480 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5050	480	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1302	124	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5414	507	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5414$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5921	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5414	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 48.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.730
S
Space mean speed in ramp influence area, S = 25.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 25.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5530 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 840 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5530	840	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1425	216	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	5929		888		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5929$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5929	4700	Yes
Fi F			
$v = v - v$	5041	4700	Yes
FO F R			
v	888	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5929	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 52.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.378$
S
Space mean speed in ramp influence area, $S = 56.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.3$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4690 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 270 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4690	270	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1209	70	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5028	285	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5028$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 5313 4700 Yes
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5028	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 43.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.088
S
Space mean speed in ramp influence area, S = 40.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 40.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4960 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 150 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4960	150	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1278	39	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5318	159	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5318$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5477	4700	Yes
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5318	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 45.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.209
S
Space mean speed in ramp influence area, S = 37.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 37.2 mph

Average passenger-car speed, S 60.2 mi/h
 Number of lanes, N 2
 Density, D 34.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To:
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3860 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 995 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2069 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2069 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: jmo
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Placer Parkway Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3860 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1630 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3860	1630	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	995	420	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4139	1722	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4139$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4139	4700	No
Fi F			
$v = v - v$	2417	4700	No
FO F R			
v	1722	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4139	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 37.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.453$
S
Space mean speed in ramp influence area, $S = 54.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Placer Parkway On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2230 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 380 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2230	380	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	575	98	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2391	402	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2391$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2793	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2391	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.340
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.2 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 21.5 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Placer Parkway
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2610 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 673 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1399 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1399 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Placer Parkway
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1600 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 412 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 874 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 874 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Placer Parkway Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1600 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 220 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1600	220	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	412	57	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	1748		232		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1748$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1748	4700	No
Fi F			
$v = v - v$	1516	4700	No
FO F R			
v	232	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1748	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 16.6$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.319$
S
Space mean speed in ramp influence area, $S = 57.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Placer Parkway On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1380 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 1280 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1380	1280	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	356	330	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1508	1353	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1508$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2861 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1508	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.344
S
Space mean speed in ramp influence area, S = 57.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.1 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 22.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2660 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 686 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1453 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1453 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5590 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5590	580	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1441	149	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	6109		613		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6109$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6109	4700	Yes
Fi F			
$v = v - v$	5496	4700	Yes
FO F R			
v	613	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	6109	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 54.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.353$
S
Space mean speed in ramp influence area, $S = 56.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5010 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 360 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5010	360	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1291	93	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5475	380	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5475 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5855	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5475	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 47.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.657
S
Space mean speed in ramp influence area, S = 26.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 26.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5370 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5370	330	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1384	85	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5868	349	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5868 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6217	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5868	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 50.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.231
S
Space mean speed in ramp influence area, S = 13.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 13.7 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5700 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1070 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5700	1070	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1469	276	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6229	1131	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 6229$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	6229	4700	Yes
Fi F			
$v = v - v$	5098	4700	Yes
FO F R			
v	1131	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	6229	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 39.8$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.400$
S
Space mean speed in ramp influence area, $S = 55.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4630 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 370 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4630	370	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1193	95	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5060	391	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 5060 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5451	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5060	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 44.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.205
S
Space mean speed in ramp influence area, S = 37.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 37.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5000 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 110 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5000	110	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1289	28	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5464	116	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5464$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5580	4700	Yes
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5464	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 45.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 1.310
S
Space mean speed in ramp influence area, S = 34.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 34.9 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 15.3 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak
 Freeway/Direction: Placer Parkway EB
 From/To: SR 99 to Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1850 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 477 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 992 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 992 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: Placer Parkway EB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1850 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 720 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1850	720	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	477	186	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1984	761	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1984$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1984	4700	No
Fi F			
$v = v - v$	1223	4700	No
FO F R			
v	761	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1984	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 12.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.366$
S
Space mean speed in ramp influence area, $S = 56.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: Placer Parkway EB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1130 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 1430 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1130	1430	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	291	369	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1212	1511	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1212$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2723	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?			No
3 or av34			
Is $v v > 1.5 v / 2$			No
3 or av34	12		
If yes, v =			(Equation 25-8)
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1212	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.290
S
Space mean speed in ramp influence area, S = 58.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.3 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 21.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak
 Freeway/Direction: Placer Parkway EB
 From/To: East of Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2560 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 660 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1372 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1372 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 11.5 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak
 Freeway/Direction: Placer Parkway WB
 From/To: East of Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1390 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 358 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 745 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 745 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: Placer Parkway WB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1390 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 710 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1390	710	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	358	183	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 1490 750 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1490$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1490	4700	No
Fi F			
$v = v - v$	740	4700	No
FO F R			
v	750	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1490	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 8.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, $D = 0.366$
S
Space mean speed in ramp influence area, $S = 56.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: Placer Parkway WB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 680 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 980 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	680	980	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	175	253	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	729	1036	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 729$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 1765 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	729	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.254
S
Space mean speed in ramp influence area, S = 59.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 59.2 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.7 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/14/08
 Analysis Time Period: PM Peak
 Freeway/Direction: Placer Parkway WB
 From/To: Road C to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1660 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 428 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 890 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 890 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 5110 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1105 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5110	1105	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1317	285	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 5584 1168 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5584$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5584	4700	Yes
Fi F			
v = v - v	4416	4700	No
FO F R			
v	1168	2200	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5584	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 38.8$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.143$
S
Space mean speed in ramp influence area, $S = 61.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3835 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1105 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3835	1105	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	988	285	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4112	1168	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4112 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5280	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4112	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.892
S
Space mean speed in ramp influence area, S = 44.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 44.5 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4980 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1165 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4980	1165	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1284	300	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5442	1231	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 5442$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	5442	4700	Yes
Fi F			
$v = v - v$	4211	4700	No
FO F R			
v	1231	2200	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	5442	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 37.6$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.149$
S
Space mean speed in ramp influence area, $S = 61.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	4980 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	1165 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4980	1165	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1284	300	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5339	1231	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 5339$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6570	4700	Yes
v v	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is v v	> 2700	pc/h?	No
3 or av34			
Is v v	> 1.5 v /2		No
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	5339	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 46.7$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 2.908
S
Space mean speed in ramp influence area, S = -1.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = mph

Leisch Method for Weaving Analysis

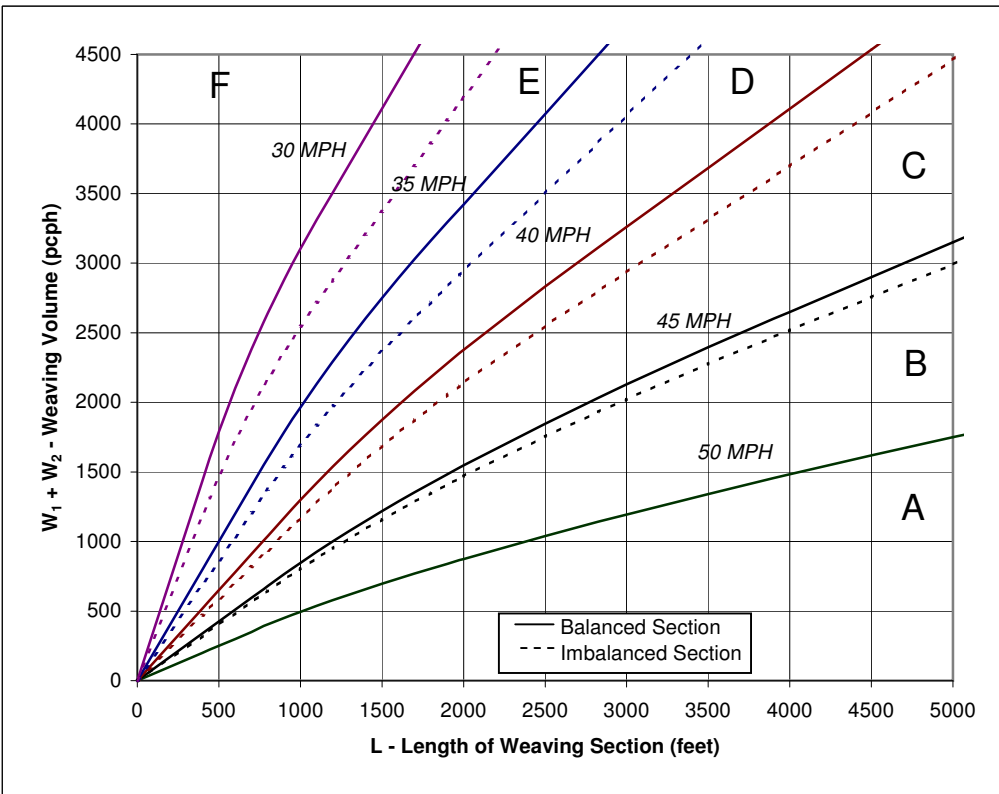
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

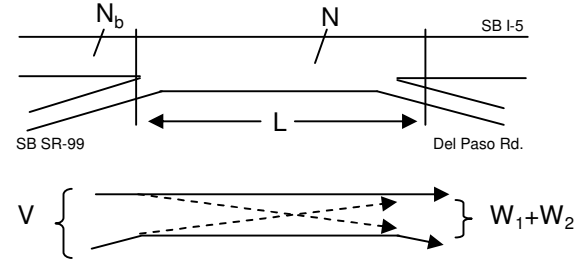
Project Information

Project	South Sutter County
Scenario	Cumulative PP WPP - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	7,820	Volume (vph)*	4,005	Volume (vph)*	950
Truck Percentage	12%	Truck Percentage	5%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	8,289	Volume (pcph)	4,105	Volume (pcph)	974



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **18.5**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,559**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	9050	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	9050	5215
Lanes	3	2
Capacity Check	LOS F	LOS F

f_{HV}	0.9615
----------	--------

v_i	9703.093	pc/hr/ln
-------	----------	----------

Density, D	35.3	pc/mi/ln
-------------------	------	----------

LOS	LOS F
------------	-------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP WPP AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"

Sutter Pointe EIR
Cumulative Plus Project No PP AM






































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	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.94	0.95	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	5085	1583	3433	5085	1583	3433	3539	1583	4990	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	3433	3539	1583	4990	3539	1583
Volume (vph)	10	620	20	690	2390	910	80	50	360	470	40	60
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)	11	674	22	750	2598	989	87	54	391	511	43	65
RTOR Reduction (vph)	0	0	12	0	0	0	0	0	0	0	0	57
Lane Group Flow (vph)	11	674	10	750	2598	989	87	54	391	511	43	8
Turn Type	Prot		Perm	Prot		Free	Prot		Free	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			Free			Free			8
Actuated Green, G (s)	0.8	52.3	52.3	30.1	81.6	120.0	7.1	9.6	120.0	12.0	14.5	14.5
Effective Green, g (s)	0.8	52.3	52.3	30.1	81.6	120.0	7.1	9.6	120.0	12.0	14.5	14.5
Actuated g/C Ratio	0.01	0.44	0.44	0.25	0.68	1.00	0.06	0.08	1.00	0.10	0.12	0.12
Clearance Time (s)	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
Lane Grp Cap (vph)	12	2216	690	861	3458	1583	203	283	1583	499	428	191
v/s Ratio Prot	0.01	0.13		c0.22	c0.51		0.03	0.02		c0.10	0.01	
v/s Ratio Perm			0.01			c0.62			0.25			0.00
v/c Ratio	0.92	0.30	0.01	0.87	0.75	0.62	0.43	0.19	0.25	1.02	0.10	0.04
Uniform Delay, d1	59.6	22.0	19.2	43.1	12.6	0.0	54.5	51.6	0.0	54.0	46.9	46.6
Progression Factor	1.00	1.00	1.00	0.97	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	212.2	0.4	0.0	1.0	0.1	0.2	1.5	0.3	0.4	46.5	0.1	0.1
Delay (s)	271.7	22.4	19.3	42.6	11.6	0.2	55.9	51.9	0.4	100.5	47.0	46.7
Level of Service	F	C	B	D	B	A	E	D	A	F	D	D
Approach Delay (s)		26.2			14.4			14.7			91.2	
Approach LOS		C			B			B			F	

Intersection Summary

HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



































HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP AM

												
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	0.97	0.86	1.00	0.94	0.86	1.00	0.94	0.95	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	4990	6408	1583	4990	3539	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	4990	6408	1583	4990	3539	1583	3433	5085	1583
Volume (vph)	310	1500	620	720	1650	110	430	170	180	130	360	590
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)	337	1630	674	783	1793	120	467	185	196	141	391	641
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	0	0	0	0
Lane Group Flow (vph)	337	1630	674	783	1793	61	467	185	196	141	391	641
Turn Type	Prot		Free		Prot		Perm		Prot		Free	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			6			Free			Free
Actuated Green, G (s)	16.2	49.5	120.0	24.4	57.7	57.7	12.0	21.4	120.0	8.7	18.1	120.0
Effective Green, g (s)	16.2	49.5	120.0	24.4	57.7	57.7	12.0	21.4	120.0	8.7	18.1	120.0
Actuated g/C Ratio	0.13	0.41	1.00	0.20	0.48	0.48	0.10	0.18	1.00	0.07	0.15	1.00
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)	463	2643	1583	1015	3081	761	499	631	1583	249	767	1583
v/s Ratio Prot	0.10	c0.25		c0.16	0.28		c0.09	0.05		0.04	0.08	
v/s Ratio Perm			c0.43			0.04			0.12			0.40
v/c Ratio	0.73	0.62	0.43	0.77	0.58	0.08	0.94	0.29	0.12	0.57	0.51	0.40
Uniform Delay, d1	49.8	27.8	0.0	45.2	22.5	16.8	53.6	42.7	0.0	53.8	46.9	0.0
Progression Factor	0.95	1.23	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.4	0.3	3.7	0.8	0.2	25.0	0.3	0.2	2.9	0.5	0.8
Delay (s)	49.2	34.6	0.3	48.9	23.3	17.0	78.7	43.0	0.2	56.8	47.4	0.8
Level of Service	D	C	A	D	C	B	E	D	A	E	D	A
Approach Delay (s)		27.7			30.4			52.7			23.0	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM Average Control Delay			30.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			63.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

























HCM Signalized Intersection Capacity Analysis
47: Riego Rd & Road "S"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.94	0.95	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	5085	1583	3433	5085	1583	3433	3539	1583	4990	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	3433	3539	1583	4990	3539	1583
Volume (vph)	10	2070	130	430	1030	1040	70	80	670	1540	140	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	2134	134	443	1062	1072	72	82	691	1588	144	10
RTOR Reduction (vph)	0	0	42	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	10	2134	92	443	1062	1072	72	82	691	1588	144	3
Turn Type	Prot		Perm	Prot		Free	Prot		Free	Prot		Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			2			Free			Free			8
Actuated Green, G (s)	1.6	61.3	61.3	16.4	76.1	150.0	4.0	10.3	150.0	46.0	52.3	52.3
Effective Green, g (s)	1.6	61.3	61.3	16.4	76.1	150.0	4.0	10.3	150.0	46.0	52.3	52.3
Actuated g/C Ratio	0.01	0.41	0.41	0.11	0.51	1.00	0.03	0.07	1.00	0.31	0.35	0.35
Clearance Time (s)	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
Lane Grp Cap (vph)	19	2078	647	375	2580	1583	92	243	1583	1530	1234	552
v/s Ratio Prot	0.01	c0.42		c0.13	0.21		0.02	0.02		c0.32	0.04	
v/s Ratio Perm			0.06			c0.68			0.44			0.00
v/c Ratio	0.53	1.03	0.14	1.18	0.41	0.68	0.78	0.34	0.44	1.04	0.12	0.01
Uniform Delay, d1	73.8	44.4	27.8	66.8	23.0	0.0	72.6	66.6	0.0	52.0	33.2	31.9
Progression Factor	1.00	1.00	1.00	0.98	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.9	27.0	0.5	100.0	0.4	1.7	34.1	0.8	0.9	33.5	0.0	0.0
Delay (s)	97.7	71.3	28.3	165.3	20.2	1.7	106.6	67.4	0.9	85.5	33.2	31.9
Level of Service	F	E	C	F	C	A	F	E	A	F	C	C
Approach Delay (s)		68.9			37.5			16.3			80.8	
Approach LOS		E			D			B			F	
Intersection Summary												
HCM Average Control Delay			54.8				HCM Level of Service				D	
HCM Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)				12.0	
Intersection Capacity Utilization			98.2%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
50: Riego Rd & Road "A"

Sutter Pointe EIR
Cumulative Plus Project No PP PM

												
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	0.97	0.86	1.00	0.94	0.86	1.00	0.94	0.95	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	6408	1583	4990	6408	1583	4990	3539	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	6408	1583	4990	6408	1583	4990	3539	1583	3433	5085	1583
Volume (vph)	860	1720	850	710	1520	200	1170	620	680	200	440	640
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	887	1773	876	732	1567	206	1206	639	701	206	454	660
RTOR Reduction (vph)	0	0	0	0	0	120	0	0	0	0	0	0
Lane Group Flow (vph)	887	1773	876	732	1567	86	1206	639	701	206	454	660
Turn Type	Prot		Free	Prot		Perm	Prot		Free	Prot		Free
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases			Free			6			Free			Free
Actuated Green, G (s)	39.2	42.0	150.0	32.2	35.0	35.0	38.6	46.3	150.0	13.5	21.2	150.0
Effective Green, g (s)	39.2	42.0	150.0	32.2	35.0	35.0	38.6	46.3	150.0	13.5	21.2	150.0
Actuated g/C Ratio	0.26	0.28	1.00	0.21	0.23	0.23	0.26	0.31	1.00	0.09	0.14	1.00
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)	897	1794	1583	1071	1495	369	1284	1092	1583	309	719	1583
v/s Ratio Prot	c0.26	c0.28		0.15	0.24		c0.24	0.18		0.06	0.09	
v/s Ratio Perm			c0.55			0.05			0.44			0.42
v/c Ratio	0.99	0.99	0.55	0.68	1.05	0.23	0.94	0.59	0.44	0.67	0.63	0.42
Uniform Delay, d1	55.2	53.8	0.0	54.2	57.5	46.6	54.6	43.7	0.0	66.1	60.7	0.0
Progression Factor	0.96	1.11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.1	10.1	0.5	1.8	37.0	1.5	13.0	0.8	0.9	5.4	1.8	0.8
Delay (s)	67.9	69.6	0.5	56.0	94.5	48.1	67.6	44.6	0.9	71.4	62.5	0.8
Level of Service	E	E	A	E	F	D	E	D	A	E	E	A
Approach Delay (s)		52.1			79.5			43.4			33.1	
Approach LOS		D			E			D			C	

Intersection Summary

HCM Average Control Delay	54.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

**EXISTING CONDITIONS
PLUS PHASE 1 PROJECT
WITH MITIGATION MEASURES**

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Point EIR
Existing Plus Project PM With Mitigation



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
Lane Util. Factor		0.86	1.00		0.81	0.81				0.97		0.76
Frt		1.00	0.85		0.99	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		6408	1583		5991	1282				3433		3610
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		6408	1583		5991	1282				3433		3610
Volume (vph)	0	1930	1740	0	1930	1020	0	0	0	120	0	450
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1990	1794	0	1990	1052	0	0	0	124	0	464
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	0	0	0	5
Lane Group Flow (vph)	0	1990	1794	0	2086	950	0	0	0	124	0	459
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					8		
Permitted Phases			Free			Free						8
Actuated Green, G (s)		50.3	75.0		50.3	75.0				16.7		16.7
Effective Green, g (s)		50.3	75.0		50.3	75.0				16.7		16.7
Actuated g/C Ratio		0.67	1.00		0.67	1.00				0.22		0.22
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		4298	1583		4018	1282				764		804
v/s Ratio Prot		0.31			0.35					0.04		
v/s Ratio Perm			c1.13			0.74						0.13
v/c Ratio		0.46	1.13		0.52	0.74				0.16		0.57
Uniform Delay, d1		5.9	37.5		6.2	0.0				23.5		26.0
Progression Factor		0.51	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.2	64.5		0.5	3.9				0.1		1.0
Delay (s)		3.2	102.0		6.7	3.9				23.6		26.9
Level of Service		A	F		A	A				C		C
Approach Delay (s)		50.1			5.8			0.0			26.2	
Approach LOS		D			A			A			C	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Existing Plus Phase 1 With Mitigation AM

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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	4150	1583	1770	4803	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		1770	1863	1583	1770	4150	1583	1770	4803	1583
Volume (vph)	10	10	10	30	10	30	10	880	20	100	2160	10
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)	11	11	11	33	11	33	11	957	22	109	2348	11
RTOR Reduction (vph)	0	10	0	0	0	30	0	0	9	0	0	3
Lane Group Flow (vph)	11	12	0	33	11	3	11	957	13	109	2348	8
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	0.7	6.1		1.6	7.0	7.0	0.7	49.1	49.1	9.3	57.7	57.7
Effective Green, g (s)	0.7	6.1		1.6	7.0	7.0	0.7	49.1	49.1	9.3	57.7	57.7
Actuated g/C Ratio	0.01	0.07		0.02	0.09	0.09	0.01	0.60	0.60	0.11	0.70	0.70
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)	15	128		34	159	135	15	2482	947	200	3376	1113
v/s Ratio Prot	0.01	c0.01		c0.02	0.01		0.01	0.23		c0.06	c0.49	
v/s Ratio Perm						0.00			0.01			0.00
v/c Ratio	0.73	0.09		0.97	0.07	0.02	0.73	0.39	0.01	0.55	0.70	0.01
Uniform Delay, d1	40.6	35.4		40.2	34.6	34.4	40.6	8.6	6.7	34.4	7.1	3.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	103.2	0.3		141.9	0.2	0.1	103.2	0.1	0.0	3.0	0.6	0.0
Delay (s)	143.8	35.7		182.1	34.7	34.5	143.8	8.7	6.7	37.4	7.7	3.6
Level of Service	F	D		F	C	C	F	A	A	D	A	A
Approach Delay (s)		71.8			97.8			10.2			9.0	
Approach LOS		E			F			B			A	

Intersection Summary

HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM



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	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)	10	490	820	80	70	30
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	533	891	87	76	33
RTOR Reduction (vph)	0	0	0	50	0	26
Lane Group Flow (vph)	11	533	891	37	76	7
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	0.5	18.8	14.3	14.3	7.2	7.2
Effective Green, g (s)	0.5	18.8	14.3	14.3	7.2	7.2
Actuated g/C Ratio	0.01	0.55	0.42	0.42	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)	26	1957	1488	666	375	335
v/s Ratio Prot	0.01	c0.15	c0.25		c0.04	
v/s Ratio Perm				0.02		0.00
v/c Ratio	0.42	0.27	0.60	0.05	0.20	0.02
Uniform Delay, d1	16.6	4.0	7.6	5.8	11.0	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	0.1	0.7	0.0	0.3	0.0
Delay (s)	27.3	4.1	8.3	5.9	11.3	10.6
Level of Service	C	A	A	A	B	B
Approach Delay (s)		4.5	8.1		11.1	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	34.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM




























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	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Volume (vph)	450	110	60	800	100	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	489	120	65	870	109	22
RTOR Reduction (vph)	0	77	0	0	0	17
Lane Group Flow (vph)	489	43	65	870	109	5
Turn Type		Perm	Prot			Perm
Protected Phases	2		1		4	
Permitted Phases		2		6		4
Actuated Green, G (s)	12.2	12.2	1.8	18.0	7.7	7.7
Effective Green, g (s)	12.2	12.2	1.8	18.0	7.7	7.7
Actuated g/C Ratio	0.36	0.36	0.05	0.53	0.23	0.23
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)	1281	573	95	1890	404	362
v/s Ratio Prot	0.14		0.04		c0.06	
v/s Ratio Perm		0.03		c0.25		0.00
v/c Ratio	0.38	0.08	0.68	0.46	0.27	0.01
Uniform Delay, d1	8.0	7.1	15.7	4.8	10.7	10.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	18.5	0.2	0.4	0.0
Delay (s)	8.1	7.1	34.1	5.0	11.1	10.1
Level of Service	A	A	C	A	B	B
Approach Delay (s)	7.9			7.1	10.9	
Approach LOS	A			A	B	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM

												
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	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1640		1770	1723	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1640		1770	1723	
Volume (vph)	10	450	10	90	840	40	10	10	40	30	10	10
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)	11	489	11	98	913	43	11	11	43	33	11	11
RTOR Reduction (vph)	0	0	7	0	0	25	0	35	0	0	9	0
Lane Group Flow (vph)	11	489	4	98	913	18	11	19	0	33	13	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						
Actuated Green, G (s)	0.4	15.7	15.7	4.3	19.6	19.6	0.4	9.0		1.1	9.7	
Effective Green, g (s)	0.4	15.7	15.7	4.3	19.6	19.6	0.4	9.0		1.1	9.7	
Actuated g/C Ratio	0.01	0.34	0.34	0.09	0.43	0.43	0.01	0.20		0.02	0.21	
Clearance Time (s)	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	
Lane Grp Cap (vph)	15	1205	539	165	1505	673	15	320		42	363	
v/s Ratio Prot	0.01	0.14		c0.06	c0.26		0.01	c0.01		c0.02	0.01	
v/s Ratio Perm			0.00			0.01						
v/c Ratio	0.73	0.41	0.01	0.59	0.61	0.03	0.73	0.06		0.79	0.04	
Uniform Delay, d1	22.8	11.6	10.0	20.1	10.3	7.7	22.8	15.1		22.4	14.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	103.2	0.2	0.0	5.6	0.7	0.0	103.2	0.1		62.3	0.0	
Delay (s)	126.0	11.9	10.1	25.7	11.0	7.7	126.0	15.2		84.6	14.5	
Level of Service	F	B	B	C	B	A	F	B		F	B	
Approach Delay (s)		14.3			12.2			33.9			56.6	
Approach LOS		B			B			C			E	
Intersection Summary												
HCM Average Control Delay			15.1				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			46.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			44.9%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM



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	0.95	0.95	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	3539	1583	1722	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	3539	1583	1722	
Volume (vph)	10	480	950	10	20	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	522	1033	11	22	11
RTOR Reduction (vph)	0	0	0	2	11	0
Lane Group Flow (vph)	11	522	1033	9	22	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		7	
Permitted Phases				6		
Actuated Green, G (s)	1.5	74.5	69.0	69.0	1.5	
Effective Green, g (s)	1.5	74.5	69.0	69.0	1.5	
Actuated g/C Ratio	0.02	0.89	0.82	0.82	0.02	
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)	32	3139	2907	1300	31	
v/s Ratio Prot	c0.01	0.15	c0.29		c0.01	
v/s Ratio Perm				0.01		
v/c Ratio	0.34	0.17	0.36	0.01	0.72	
Uniform Delay, d1	40.8	0.6	1.9	1.3	41.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.3	0.0	0.1	0.0	56.3	
Delay (s)	47.1	0.7	2.0	1.3	97.3	
Level of Service	D	A	A	A	F	
Approach Delay (s)		1.6	2.0		97.3	
Approach LOS		A	A		F	

Intersection Summary

HCM Average Control Delay	3.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			























HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM

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
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3451		1770	3539	1583	1770	3539	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3451		1770	3539	1583	1770	3539	1583	1770	1863	1583
Volume (vph)	300	200	40	270	590	70	10	510	280	40	390	640
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)	326	217	43	293	641	76	11	554	304	43	424	696
RTOR Reduction (vph)	0	13	0	0	0	55	0	0	210	0	0	54
Lane Group Flow (vph)	326	247	0	293	641	21	11	554	94	43	424	642
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	22.7	27.9		21.2	26.4	26.4	0.5	29.6	29.6	3.1	32.2	54.9
Effective Green, g (s)	22.7	29.9		21.2	28.4	28.4	0.5	31.6	31.6	3.1	34.2	56.9
Actuated g/C Ratio	0.22	0.29		0.21	0.28	0.28	0.00	0.31	0.31	0.03	0.34	0.56
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	3.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	3.0
Lane Grp Cap (vph)	395	1014		369	987	442	9	1099	491	54	626	947
v/s Ratio Prot	c0.18	0.07		0.17	c0.18		0.01	0.16		c0.02	0.23	c0.15
v/s Ratio Perm						0.01			0.06			0.25
v/c Ratio	0.83	0.24		0.79	0.65	0.05	1.22	0.50	0.19	0.80	0.68	0.68
Uniform Delay, d1	37.7	27.3		38.2	32.3	26.8	50.6	28.7	25.7	49.0	29.1	15.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.1	0.2		10.5	1.9	0.1	385.4	0.7	0.4	51.7	3.7	1.9
Delay (s)	50.8	27.6		48.7	34.3	26.9	436.1	29.4	26.1	100.7	32.7	17.9
Level of Service	D	C		D	C	C	F	C	C	F	C	B
Approach Delay (s)		40.5			37.9			33.4			26.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM Average Control Delay			33.5									HCM Level of Service C
HCM Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			101.8									Sum of lost time (s) 16.0
Intersection Capacity Utilization			70.1%									ICU Level of Service C
Analysis Period (min)			15									
c	Critical Lane Group											

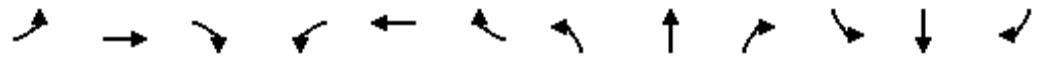
HCM Signalized Intersection Capacity Analysis
15: Elverta Rd & Hwy 99

Sutter Pointe EIR
Existing Plus Phase 1 With Mitigation AM

												
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
Lane Util. Factor		1.00	1.00	0.95	0.95		1.00	0.86	1.00	1.00	0.91	1.00
Frt		1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00	0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1817	1583	1681	1611		1770	5229	1583	1770	4803	1583
Flt Permitted		0.98	1.00	0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1817	1583	1681	1611		1770	5229	1583	1770	4803	1583
Volume (vph)	10	10	20	430	30	140	40	1690	80	40	2670	30
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)	11	11	22	467	33	152	43	1837	87	43	2902	33
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	22	22	327	304	0	43	1837	87	43	2902	33
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Free	Split			Prot		Free	Prot		Free
Protected Phases	4	4		8	8		5	2		1		6
Permitted Phases			Free						Free			Free
Actuated Green, G (s)		4.8	139.9	27.1	27.1		4.0	85.3	139.9	6.7	88.0	139.9
Effective Green, g (s)		4.8	139.9	27.1	27.1		4.0	85.3	139.9	6.7	88.0	139.9
Actuated g/C Ratio		0.03	1.00	0.19	0.19		0.03	0.61	1.00	0.05	0.63	1.00
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		62	1583	326	312		51	3188	1583	85	3021	1583
v/s Ratio Prot		c0.01		c0.19	0.19		c0.02	0.35		0.02	c0.60	
v/s Ratio Perm			0.01						0.05			0.02
v/c Ratio		0.35	0.01	1.00	0.97		0.84	0.58	0.05	0.51	0.96	0.02
Uniform Delay, d1		66.0	0.0	56.4	56.1		67.6	16.4	0.0	65.0	24.3	0.0
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.5	0.0	50.6	43.7		70.6	0.3	0.1	4.7	9.0	0.0
Delay (s)		69.5	0.0	107.0	99.7		138.2	16.7	0.1	69.7	33.3	0.0
Level of Service		E	A	F	F		F	B	A	E	C	A
Approach Delay (s)		34.8			103.4			18.6			33.5	
Approach LOS		C			F			B			C	
Intersection Summary												
HCM Average Control Delay			36.4			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			139.9			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			81.9%			ICU Level of Service				D		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM



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)	10	110	10	120	750	50	0	0	30	0	0	20
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)	11	120	11	130	815	54	0	0	33	0	0	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.56						0.56	0.56		0.56	0.56	0.56
vC, conflicting volume	870			130			1272	1277	125	1283	1255	842
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	768			130			1484	1494	125	1503	1455	719
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 %	98			91			100	100	96	100	100	91
cM capacity (veh/h)	475			1455			48	61	926	50	65	240

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	141	1000	33	22
Volume Left	11	130	0	0
Volume Right	11	54	33	22
cSH	475	1455	926	240
Volume to Capacity	0.02	0.09	0.04	0.09
Queue Length 95th (ft)	2	7	3	7
Control Delay (s)	1.3	2.2	9.0	21.5
Lane LOS	A	A	A	C
Approach Delay (s)	1.3	2.2	9.0	21.5
Approach LOS			A	C

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM



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
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1860		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1860		1770	1583
Volume (vph)	20	130	850	10	60	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	141	924	11	65	76
RTOR Reduction (vph)	0	0	0	0	0	67
Lane Group Flow (vph)	22	141	935	0	65	9
Turn Type	Prot			Perm		
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	1.8	62.9	57.1		9.4	9.4
Effective Green, g (s)	1.8	62.9	57.1		9.4	9.4
Actuated g/C Ratio	0.02	0.78	0.71		0.12	0.12
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)	40	1459	1323		207	185
v/s Ratio Prot	c0.01	0.08	c0.50		c0.04	
v/s Ratio Perm						0.01
v/c Ratio	0.55	0.10	0.71		0.31	0.05
Uniform Delay, d1	38.8	2.0	6.7		32.5	31.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.3	0.0	1.7		0.9	0.1
Delay (s)	54.2	2.1	8.5		33.4	31.6
Level of Service	D	A	A		C	C
Approach Delay (s)		9.1	8.5		32.4	
Approach LOS		A	A		C	

Intersection Summary

HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM















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
Lane Util. Factor		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)		1863	1583		1863	1583				1770	1583	1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)		1863	1583		1863	1583				1770	1583	1583
Volume (vph)	0	70	10	0	10	870	0	0	0	140	0	10
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	76	11	0	11	946	0	0	0	152	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	76	11	0	11	946	0	0	0	152	0	3
Turn Type		Free			Free					Prot	custom	
Protected Phases		2			6					4		
Permitted Phases		Free			Free						4	
Actuated Green, G (s)		28.1	48.4		28.1	48.4				12.3	12.3	12.3
Effective Green, g (s)		28.1	48.4		28.1	48.4				12.3	12.3	12.3
Actuated g/C Ratio		0.58	1.00		0.58	1.00				0.25	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)		1082	1583		1082	1583				450	402	402
v/s Ratio Prot		0.04			0.01					0.09		
v/s Ratio Perm			0.01			0.60						0.00
v/c Ratio		0.07	0.01		0.01	0.60				0.34	0.01	0.01
Uniform Delay, d1		4.4	0.0		4.3	0.0				14.7	13.5	13.5
Progression Factor		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		0.0	0.0		0.0	1.7				0.4	0.0	0.0
Delay (s)		4.5	0.0		4.3	1.7				15.2	13.5	13.5
Level of Service		A	A		A	A				B	B	B
Approach Delay (s)		3.9			1.7			0.0			15.1	
Approach LOS		A			A			A			B	

Intersection Summary

HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	48.4	Sum of lost time (s)	0.0
Intersection Capacity Utilization	18.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM

												
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	1.00		1.00	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		1863	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		1863	1583	1770		1583			
Volume (vph)	0	140	70	0	870	210	10	0	280	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)	0	152	76	0	946	228	11	0	304	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	251	0	0	0
Lane Group Flow (vph)	0	152	76	0	946	228	11	0	53	0	0	0
Turn Type		Free			Free		Prot		custom			
Protected Phases		2			6		4					
Permitted Phases		Free			Free				4			
Actuated Green, G (s)		30.8	47.0		30.8	47.0	8.2		8.2			
Effective Green, g (s)		30.8	47.0		30.8	47.0	8.2		8.2			
Actuated g/C Ratio		0.66	1.00		0.66	1.00	0.17		0.17			
Clearance Time (s)		4.0			4.0		4.0		4.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		1221	1583		1221	1583	309		276			
v/s Ratio Prot		0.08			c0.51		0.01					
v/s Ratio Perm			0.05			c0.14			0.03			
v/c Ratio		0.12	0.05		0.77	0.14	0.04		0.19			
Uniform Delay, d1		3.0	0.0		5.7	0.0	16.1		16.6			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.0	0.1		3.1	0.2	0.0		0.3			
Delay (s)		3.1	0.1		8.8	0.2	16.2		16.9			
Level of Service		A	A		A	A	B		B			
Approach Delay (s)		2.1			7.1			16.9			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay		8.3			HCM Level of Service				A			
HCM Volume to Capacity ratio		0.60										
Actuated Cycle Length (s)		47.0			Sum of lost time (s)				4.0			
Intersection Capacity Utilization		55.8%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
 Existing Plus Phase 1 With Mitigation AM



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
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1859		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1859		1770	1583
Volume (vph)	40	580	700	10	30	130
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	630	761	11	33	141
RTOR Reduction (vph)	0	0	0	0	0	120
Lane Group Flow (vph)	43	630	772	0	33	21
Turn Type	Prot			custom		
Protected Phases	7	4	8		1	
Permitted Phases						6
Actuated Green, G (s)	2.4	32.3	25.9		7.2	7.2
Effective Green, g (s)	2.4	32.3	25.9		7.2	7.2
Actuated g/C Ratio	0.05	0.68	0.55		0.15	0.15
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)	89	1267	1014		268	240
v/s Ratio Prot	0.02	c0.34	c0.41		c0.02	
v/s Ratio Perm						0.01
v/c Ratio	0.48	0.50	0.76		0.12	0.09
Uniform Delay, d1	21.9	3.7	8.4		17.4	17.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.1	0.3	3.4		0.2	0.2
Delay (s)	26.0	4.0	11.8		17.6	17.5
Level of Service	C	A	B		B	B
Approach Delay (s)		5.4	11.8		17.5	
Approach LOS		A	B		B	

Intersection Summary

HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps













Sutter Pointe EIR
Existing Plus Phase 1 With Mitigation AM



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	
Lane Util. Factor		0.95	1.00		0.86	0.86				1.00		1.00	
Frt		1.00	0.85		0.98	0.85				1.00		0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (prot)		3539	1583		4731	1362				1770		1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00	
Satd. Flow (perm)		3539	1583		4731	1362				1770		1583	
Volume (vph)	0	270	380	0	1550	1090	0	0	0	60	0	170	
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	293	413	0	1685	1185	0	0	0	65	0	185	
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	0	0	0	13	
Lane Group Flow (vph)	0	293	413	0	1875	989	0	0	0	65	0	172	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4	
Actuated Green, G (s)		84.9	110.0		84.9	110.0				17.1		17.1	
Effective Green, g (s)		84.9	110.0		84.9	110.0				17.1		17.1	
Actuated g/C Ratio		0.77	1.00		0.77	1.00				0.16		0.16	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2731	1583		3651	1362				275		246	
v/s Ratio Prot		0.08			0.40					0.04			
v/s Ratio Perm			0.26			c0.73						0.11	
v/c Ratio		0.11	0.26		0.51	0.73				0.24		0.70	
Uniform Delay, d1		3.1	0.0		4.7	0.0				40.7		44.0	
Progression Factor		0.49	1.00		1.00	1.00				1.00		1.00	
Incremental Delay, d2		0.0	0.2		0.5	3.4				0.4		8.7	
Delay (s)		1.6	0.2		5.3	3.4				41.2		52.7	
Level of Service		A	A		A	A				D		D	
Approach Delay (s)		0.8			4.6			0.0			49.7		
Approach LOS		A			A			A			D		
Intersection Summary													
HCM Average Control Delay			6.9									HCM Level of Service	A
HCM Volume to Capacity ratio			0.73										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	0.0
Intersection Capacity Utilization			55.2%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													
























HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Pointe EIR
Existing Plus Phase 1 With Mitigation AM

												
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			
Lane Util. Factor		0.95	1.00		0.91	1.00	0.95	0.86	0.91			
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3539	1583		5085	1583	1681	1522	2882			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3539	1583		5085	1583	1681	1522	2882			
Volume (vph)	0	320	10	0	1890	30	750	0	540	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)	0	348	11	0	2054	33	815	0	587	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	267	0	0	0
Lane Group Flow (vph)	0	348	11	0	2054	33	417	398	320	0	0	0
Turn Type		Free			Free		Prot	custom				
Protected Phases		2			6		4	8				
Permitted Phases		Free			Free			4				
Actuated Green, G (s)		42.0	110.0		42.0	110.0	60.0	60.0	60.0			
Effective Green, g (s)		42.0	110.0		42.0	110.0	60.0	60.0	60.0			
Actuated g/C Ratio		0.38	1.00		0.38	1.00	0.55	0.55	0.55			
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)		1351	1583		1942	1583	917	830	1572			
v/s Ratio Prot		0.10			c0.40		0.25	c0.26				
v/s Ratio Perm			0.01			0.02			0.11			
v/c Ratio		0.26	0.01		1.06	0.02	0.45	0.48	0.20			
Uniform Delay, d1		23.3	0.0		34.0	0.0	15.1	15.4	12.8			
Progression Factor		1.00	1.00		0.83	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.5	0.0		35.9	0.0	0.4	0.4	0.1			
Delay (s)		23.8	0.0		64.3	0.0	15.5	15.8	12.8			
Level of Service		C	A		E	A	B	B	B			
Approach Delay (s)		23.0			63.3			14.5			0.0	
Approach LOS		C			E			B			A	
Intersection Summary												
HCM Average Control Delay		41.8			HCM Level of Service				D			
HCM Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		67.2%			ICU Level of Service				C			
Analysis Period (min)		15										
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Point EIR
Existing Plus Phase 1 With Mitigation PM

												
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
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	4150	1583	1770	4803	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		1770	1863	1583	1770	4150	1583	1770	4803	1583
Volume (vph)	10	10	10	20	10	70	10	2110	40	20	960	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	10	21	10	72	10	2175	41	21	990	10
RTOR Reduction (vph)	0	9	0	0	0	64	0	0	13	0	0	3
Lane Group Flow (vph)	10	11	0	21	10	8	10	2175	28	21	990	7
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	0.8	9.7		1.7	10.6	10.6	0.8	64.5	64.5	1.7	65.4	65.4
Effective Green, g (s)	0.8	9.7		1.7	10.6	10.6	0.8	64.5	64.5	1.7	65.4	65.4
Actuated g/C Ratio	0.01	0.10		0.02	0.11	0.11	0.01	0.69	0.69	0.02	0.70	0.70
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)	15	179		32	211	179	15	2860	1091	32	3356	1106
v/s Ratio Prot	0.01	c0.01		c0.01	0.01		0.01	c0.52		c0.01	0.21	
v/s Ratio Perm						0.01			0.02			0.00
v/c Ratio	0.67	0.06		0.66	0.05	0.05	0.67	0.76	0.03	0.66	0.29	0.01
Uniform Delay, d1	46.3	37.8		45.7	37.0	37.0	46.3	9.5	4.6	45.7	5.4	4.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	75.9	0.1		39.4	0.1	0.1	75.9	1.2	0.0	39.4	0.0	0.0
Delay (s)	122.1	38.0		85.0	37.1	37.1	122.1	10.7	4.6	85.0	5.4	4.3
Level of Service	F	D		F	D	D	F	B	A	F	A	A
Approach Delay (s)		66.0			46.9			11.1			7.0	
Approach LOS		E			D			B			A	

Intersection Summary

HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	93.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM



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	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)	20	1070	600	80	50	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	1103	619	82	52	10
RTOR Reduction (vph)	0	0	0	46	0	8
Lane Group Flow (vph)	21	1103	619	36	52	2
Turn Type	Prot		Perm		Perm	
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	0.6	19.5	14.9	14.9	6.6	6.6
Effective Green, g (s)	0.6	19.5	14.9	14.9	6.6	6.6
Actuated g/C Ratio	0.02	0.57	0.44	0.44	0.19	0.19
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)	31	2024	1546	692	343	306
v/s Ratio Prot	0.01	c0.31	0.17		c0.03	
v/s Ratio Perm				0.02		0.00
v/c Ratio	0.68	0.54	0.40	0.05	0.15	0.01
Uniform Delay, d1	16.7	4.5	6.6	5.5	11.4	11.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.6	0.3	0.2	0.0	0.2	0.0
Delay (s)	62.3	4.8	6.7	5.6	11.6	11.1
Level of Service	E	A	A	A	B	B
Approach Delay (s)		5.9	6.6		11.5	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	34.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM



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	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Volume (vph)	890	230	40	590	90	60
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	918	237	41	608	93	62
RTOR Reduction (vph)	0	89	0	0	0	53
Lane Group Flow (vph)	918	148	41	608	93	9
Turn Type		Perm	Prot		Perm	
Protected Phases	2		1		4	
Permitted Phases		2		6		4
Actuated Green, G (s)	38.3	38.3	1.9	44.2	9.0	9.0
Effective Green, g (s)	38.3	38.3	1.9	44.2	9.0	9.0
Actuated g/C Ratio	0.63	0.63	0.03	0.72	0.15	0.15
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)	2215	991	55	2556	260	233
v/s Ratio Prot	c0.26		c0.02		c0.05	
v/s Ratio Perm		0.09		0.17		0.01
v/c Ratio	0.41	0.15	0.75	0.24	0.36	0.04
Uniform Delay, d1	5.8	4.7	29.4	2.9	23.5	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	41.8	0.0	0.8	0.1
Delay (s)	5.9	4.8	71.3	2.9	24.3	22.5
Level of Service	A	A	E	A	C	C
Approach Delay (s)	5.7			7.2	23.6	
Approach LOS	A			A	C	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	61.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM

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	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1597		1770	1723	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1597		1770	1723	
Volume (vph)	10	920	20	40	610	30	10	10	190	60	10	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	948	21	41	629	31	10	10	196	62	10	10
RTOR Reduction (vph)	0	0	13	0	0	19	0	139	0	0	7	0
Lane Group Flow (vph)	10	948	8	41	629	12	10	67	0	62	13	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						
Actuated Green, G (s)	0.5	19.4	19.4	1.1	20.0	20.0	0.5	11.4		3.1	14.0	
Effective Green, g (s)	0.5	19.4	19.4	1.1	20.0	20.0	0.5	11.4		3.1	14.0	
Actuated g/C Ratio	0.01	0.38	0.38	0.02	0.39	0.39	0.01	0.22		0.06	0.27	
Clearance Time (s)	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	
Lane Grp Cap (vph)	17	1346	602	38	1388	621	17	357		108	473	
v/s Ratio Prot	0.01	c0.27		c0.02	0.18		0.01	c0.04		c0.04	c0.01	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.59	0.70	0.01	1.08	0.45	0.02	0.59	0.19		0.57	0.03	
Uniform Delay, d1	25.1	13.4	9.8	24.9	11.5	9.5	25.1	16.0		23.3	13.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	42.8	1.7	0.0	170.5	0.2	0.0	42.8	0.3		7.2	0.0	
Delay (s)	67.9	15.1	9.8	195.4	11.7	9.5	67.9	16.3		30.5	13.5	
Level of Service	E	B	A	F	B	A	E	B		C	B	
Approach Delay (s)		15.5			22.3			18.7			26.4	
Approach LOS		B			C			B			C	
Intersection Summary												
HCM Average Control Delay			18.7				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			51.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			57.7%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM



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	0.95	0.95	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	3539	1583	1723	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	3539	1583	1723	
Volume (vph)	10	1030	610	20	20	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	1062	629	21	21	10
RTOR Reduction (vph)	0	0	0	4	10	0
Lane Group Flow (vph)	10	1062	629	17	21	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		7	
Permitted Phases				6		
Actuated Green, G (s)	2.0	73.6	67.6	67.6	2.0	
Effective Green, g (s)	2.0	73.6	67.6	67.6	2.0	
Actuated g/C Ratio	0.02	0.88	0.81	0.81	0.02	
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)	42	3116	2862	1280	41	
v/s Ratio Prot	0.01	c0.30	0.18		c0.01	
v/s Ratio Perm				0.01		
v/c Ratio	0.24	0.34	0.22	0.01	0.52	
Uniform Delay, d1	40.1	0.9	1.9	1.5	40.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.9	0.1	0.0	0.0	10.6	
Delay (s)	43.0	0.9	1.9	1.6	50.9	
Level of Service	D	A	A	A	D	
Approach Delay (s)		1.3	1.9		50.9	
Approach LOS		A	A		D	

Intersection Summary

HCM Average Control Delay	2.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			























HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM

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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	3490		1770	3539	1583	1770	3539	1583	1770	1863	1583	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	3490		1770	3539	1583	1770	3539	1583	1770	1863	1583	
Volume (vph)	560	690	70	250	260	160	30	460	280	50	420	340	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	577	711	72	258	268	165	31	474	289	52	433	351	
RTOR Reduction (vph)	0	5	0	0	0	121	0	0	207	0	0	111	
Lane Group Flow (vph)	577	778	0	258	268	44	31	474	82	52	433	240	
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		pm+ov	
Protected Phases	7	4		3	8		5	2		1	6	7	
Permitted Phases						8			2			6	
Actuated Green, G (s)	42.5	42.4		20.9	20.8	20.8	2.1	31.9	31.9	4.1	33.9	76.4	
Effective Green, g (s)	42.5	44.4		20.9	22.8	22.8	2.1	33.9	33.9	4.1	35.9	78.4	
Actuated g/C Ratio	0.36	0.37		0.18	0.19	0.19	0.02	0.28	0.28	0.03	0.30	0.66	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	
Vehicle Extension (s)	3.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	3.0	
Lane Grp Cap (vph)	631	1299		310	676	303	31	1006	450	61	561	1093	
v/s Ratio Prot	c0.33	c0.22		0.15	0.08		0.02	0.13		c0.03	c0.23	0.08	
v/s Ratio Perm						0.03			0.05			0.07	
v/c Ratio	0.91	0.60		0.83	0.40	0.14	1.00	0.47	0.18	0.85	0.77	0.22	
Uniform Delay, d1	36.7	30.3		47.5	42.2	40.1	58.6	35.3	32.2	57.3	38.0	8.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.8	1.1		16.4	0.7	0.4	161.6	0.7	0.4	63.6	7.5	0.1	
Delay (s)	54.5	31.3		63.9	43.0	40.6	220.2	36.0	32.6	120.9	45.4	8.3	
Level of Service	D	C		E	D	D	F	D	C	F	D	A	
Approach Delay (s)		41.2			50.2			41.9			34.5		
Approach LOS		D			D			D			C		
Intersection Summary													
HCM Average Control Delay			41.5									HCM Level of Service	D
HCM Volume to Capacity ratio			0.76										
Actuated Cycle Length (s)			119.3									Sum of lost time (s)	8.0
Intersection Capacity Utilization			77.0%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 15: Elverta Rd & Hwy 99

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM

												
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
Lane Util. Factor		1.00	1.00	0.95	0.95		1.00	0.86	1.00	1.00	0.91	1.00
Frt		1.00	0.85	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00	0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1826	1583	1681	1599		1770	5229	1583	1770	4803	1583
Flt Permitted		0.98	1.00	0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1826	1583	1681	1599		1770	5229	1583	1770	4803	1583
Volume (vph)	20	30	20	90	10	40	20	3090	600	180	2390	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	31	21	93	10	41	21	3186	619	186	2464	10
RTOR Reduction (vph)	0	0	0	0	29	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	52	21	69	46	0	21	3186	619	186	2464	10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Split		Free	Split			Prot		Free	Prot		Free
Protected Phases	4	4		8	8		5	2		1		6
Permitted Phases			Free						Free			Free
Actuated Green, G (s)		8.0	139.1	10.9	10.9		3.5	89.1	139.1	15.1	100.7	139.1
Effective Green, g (s)		8.0	139.1	10.9	10.9		3.5	89.1	139.1	15.1	100.7	139.1
Actuated g/C Ratio		0.06	1.00	0.08	0.08		0.03	0.64	1.00	0.11	0.72	1.00
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		105	1583	132	125		45	3349	1583	192	3477	1583
v/s Ratio Prot		0.03		0.04	0.03		0.01	c0.61		c0.11	0.51	
v/s Ratio Perm			0.01						c0.39			0.01
v/c Ratio		0.50	0.01	0.52	0.36		0.47	0.95	0.39	0.97	0.71	0.01
Uniform Delay, d1		63.6	0.0	61.6	60.8		66.9	23.0	0.0	61.8	10.9	0.0
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.6	0.0	3.7	1.8		7.5	7.3	0.7	55.2	0.7	0.0
Delay (s)		67.2	0.0	65.3	62.6		74.3	30.3	0.7	117.0	11.6	0.0
Level of Service		E	A	E	E		E	C	A	F	B	A
Approach Delay (s)		47.9			63.9			25.7			18.9	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM Average Control Delay			24.1			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			139.1			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			75.4%			ICU Level of Service				D		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM



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	690	10	0	130	170	0	0	100	0	0	10
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	711	10	0	134	175	0	0	103	0	0	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked												
vC, conflicting volume	309			722			948	1026	716	1041	943	222
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	309			722			948	1026	716	1041	943	222
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			100			100	100	76	100	100	99
cM capacity (veh/h)	1251			880			237	235	430	158	262	818
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	722	309	103	10								
Volume Left	0	0	0	0								
Volume Right	10	175	103	10								
cSH	1700	1700	430	818								
Volume to Capacity	0.42	0.18	0.24	0.01								
Queue Length 95th (ft)	0	0	23	1								
Control Delay (s)	0.0	0.0	16.0	9.5								
Lane LOS			C	A								
Approach Delay (s)	0.0	0.0	16.0	9.5								
Approach LOS			C	A								
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			49.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM



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
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1855		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1855		1770	1583
Volume (vph)	60	740	300	10	40	30
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	62	763	309	10	41	31
RTOR Reduction (vph)	0	0	1	0	0	27
Lane Group Flow (vph)	62	763	318	0	41	4
Turn Type	Prot			Perm		
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	3.4	51.5	44.1		8.2	8.2
Effective Green, g (s)	3.4	51.5	44.1		8.2	8.2
Actuated g/C Ratio	0.05	0.76	0.65		0.12	0.12
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)	89	1417	1208		214	192
v/s Ratio Prot	0.04	c0.41	0.17		c0.02	
v/s Ratio Perm						0.00
v/c Ratio	0.70	0.54	0.26		0.19	0.02
Uniform Delay, d1	31.6	3.3	5.0		26.8	26.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	21.1	0.4	0.1		0.4	0.0
Delay (s)	52.7	3.7	5.1		27.2	26.2
Level of Service	D	A	A		C	C
Approach Delay (s)		7.4	5.1		26.8	
Approach LOS		A	A		C	

Intersection Summary

HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	67.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM















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
Lane Util. Factor		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)		1863	1583		1863	1583				1770	1583	1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)		1863	1583		1863	1583				1770	1583	1583
Volume (vph)	0	290	30	0	50	360	0	0	0	340	0	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	299	31	0	52	371	0	0	0	351	0	10
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	6
Lane Group Flow (vph)	0	299	31	0	52	371	0	0	0	351	0	4
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		12.8	32.2		12.8	32.2				11.4		11.4
Effective Green, g (s)		12.8	32.2		12.8	32.2				11.4		11.4
Actuated g/C Ratio		0.40	1.00		0.40	1.00				0.35		0.35
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		741	1583		741	1583				627		560
v/s Ratio Prot		c0.16			0.03					c0.20		
v/s Ratio Perm			0.02			0.23						0.00
v/c Ratio		0.40	0.02		0.07	0.23				0.56		0.01
Uniform Delay, d1		7.0	0.0		6.0	0.0				8.4		6.7
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.4	0.0		0.0	0.3				1.1		0.0
Delay (s)		7.3	0.0		6.1	0.3				9.5		6.7
Level of Service		A	A		A	A				A		A
Approach Delay (s)		6.6			1.0			0.0			9.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	32.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM

												
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	1.00		1.00	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		1863	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		1863	1583	1770		1583			
Volume (vph)	0	340	290	0	360	220	50	0	1070	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	351	299	0	371	227	52	0	1103	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	53	0	0	0
Lane Group Flow (vph)	0	351	299	0	371	227	52	0	1050	0	0	0
Turn Type		Free			Free		Prot		custom			
Protected Phases		2			6		4					
Permitted Phases		Free			Free				4			
Actuated Green, G (s)		20.1	87.5		20.1	87.5	59.4		59.4			
Effective Green, g (s)		20.1	87.5		20.1	87.5	59.4		59.4			
Actuated g/C Ratio		0.23	1.00		0.23	1.00	0.68		0.68			
Clearance Time (s)		4.0			4.0		4.0		4.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		428	1583		428	1583	1202		1075			
v/s Ratio Prot		0.19			c0.20		0.03					
v/s Ratio Perm		0.19			0.14				c0.66			
v/c Ratio		0.82	0.19		0.87	0.14	0.04		0.98			
Uniform Delay, d1		32.0	0.0		32.4	0.0	4.6		13.4			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		11.9	0.3		16.6	0.2	0.0		21.8			
Delay (s)		43.9	0.3		49.0	0.2	4.7		35.1			
Level of Service		D	A		D	A	A		D			
Approach Delay (s)		23.8			30.5			33.8			0.0	
Approach LOS		C			C			C			A	
Intersection Summary												
HCM Average Control Delay		30.3			HCM Level of Service				C			
HCM Volume to Capacity ratio		0.95										
Actuated Cycle Length (s)		87.5			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		90.8%			ICU Level of Service				E			
Analysis Period (min)		15										
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Point EIR
 Existing Plus Phase 1 With Mitigation PM



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
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1842		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1842		1770	1583
Volume (vph)	130	810	440	40	20	50
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	835	454	41	21	52
RTOR Reduction (vph)	0	0	4	0	0	44
Lane Group Flow (vph)	134	835	491	0	21	8
Turn Type	Prot			custom		
Protected Phases	7	4	8		1	
Permitted Phases						6
Actuated Green, G (s)	7.0	28.0	17.0		6.3	6.3
Effective Green, g (s)	7.0	28.0	17.0		6.3	6.3
Actuated g/C Ratio	0.17	0.66	0.40		0.15	0.15
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)	293	1233	740		264	236
v/s Ratio Prot	0.08	c0.45	0.27		c0.01	
v/s Ratio Perm						0.00
v/c Ratio	0.46	0.68	0.66		0.08	0.03
Uniform Delay, d1	15.9	4.4	10.3		15.5	15.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.1	1.5	2.2		0.1	0.1
Delay (s)	17.1	5.9	12.6		15.6	15.5
Level of Service	B	A	B		B	B
Approach Delay (s)		7.4	12.6		15.5	
Approach LOS		A	B		B	

Intersection Summary

HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Point EIR
Existing Plus Phase 1 With Mitigation PM















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
Lane Util. Factor		0.95	1.00		0.86	0.86				1.00		1.00
Frt		1.00	0.85		0.99	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		3539	1583		4742	1362				1770		1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		3539	1583		4742	1362				1770		1583
Volume (vph)	0	1220	1370	0	1600	930	0	0	0	60	0	60
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1258	1412	0	1649	959	0	0	0	62	0	62
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	30
Lane Group Flow (vph)	0	1258	1412	0	1805	800	0	0	0	62	0	32
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		110.6	130.0		110.6	130.0				11.4		11.4
Effective Green, g (s)		110.6	130.0		110.6	130.0				11.4		11.4
Actuated g/C Ratio		0.85	1.00		0.85	1.00				0.09		0.09
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		3011	1583		4034	1362				155		139
v/s Ratio Prot		0.36			0.38					0.04		
v/s Ratio Perm			c0.89			0.59						0.02
v/c Ratio		0.42	0.89		0.45	0.59				0.40		0.23
Uniform Delay, d1		2.2	0.0		2.3	0.0				56.1		55.2
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.4	8.1		0.4	1.9				1.7		0.8
Delay (s)		2.7	8.1		2.7	1.9				57.8		56.1
Level of Service		A	A		A	A				E		E
Approach Delay (s)		5.5			2.4			0.0			56.9	
Approach LOS		A			A			A			E	

Intersection Summary

HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

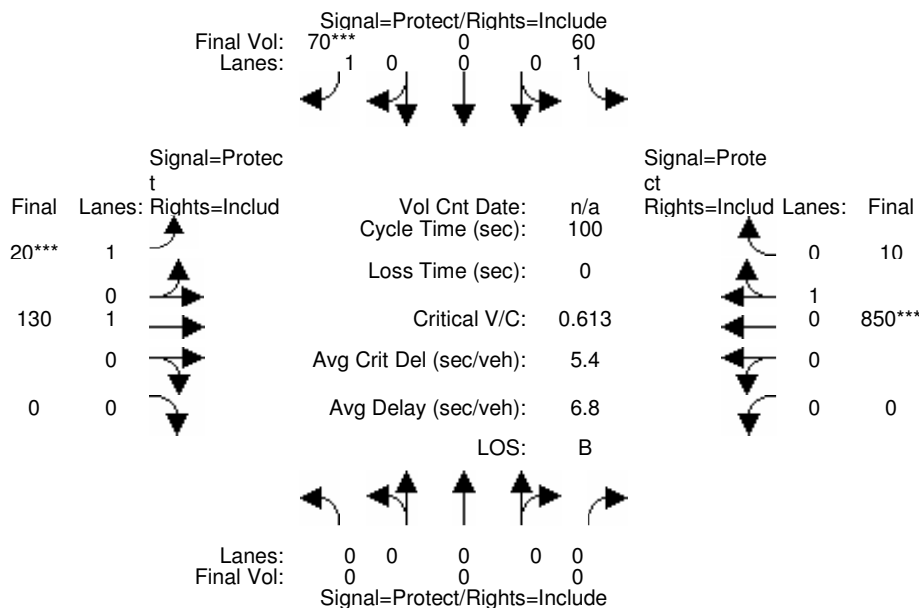
HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Point EIR
Existing Plus Phase 1 With Mitigation PM

												
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			
Lane Util. Factor		0.95	1.00		0.91	1.00	0.95	0.86	0.91			
Frt		1.00	0.85		1.00	0.85	1.00	0.93	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.97	1.00			
Satd. Flow (prot)		3539	1583		5085	1583	1681	1453	2882			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.97	1.00			
Satd. Flow (perm)		3539	1583		5085	1583	1681	1453	2882			
Volume (vph)	0	1270	10	0	1770	80	760	0	1110	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1309	10	0	1825	82	784	0	1144	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	11	20	0	0	0
Lane Group Flow (vph)	0	1309	10	0	1825	82	507	497	893	0	0	0
Turn Type		Free			Free		Prot	custom				
Protected Phases		2			6		4	8				
Permitted Phases		Free			Free			4				
Actuated Green, G (s)		59.0	130.0		59.0	130.0	63.0	63.0	63.0			
Effective Green, g (s)		59.0	130.0		59.0	130.0	63.0	63.0	63.0			
Actuated g/C Ratio		0.45	1.00		0.45	1.00	0.48	0.48	0.48			
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)		1606	1583		2308	1583	815	704	1397			
v/s Ratio Prot		c0.37			0.36		0.30	c0.34				
v/s Ratio Perm			0.01			0.05			0.31			
v/c Ratio		0.82	0.01		0.79	0.05	0.62	0.71	0.64			
Uniform Delay, d1		30.8	0.0		30.2	0.0	24.7	26.2	25.0			
Progression Factor		1.00	1.00		0.77	1.00	1.00	1.00	1.00			
Incremental Delay, d2		4.7	0.0		2.2	0.0	1.5	3.2	1.0			
Delay (s)		35.4	0.0		25.6	0.0	26.2	29.5	26.0			
Level of Service		D	A		C	A	C	C	C			
Approach Delay (s)		35.2			24.5			27.0			0.0	
Approach LOS		D			C			C			A	
Intersection Summary												
HCM Average Control Delay		28.1			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		130.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		72.8%			ICU Level of Service			C				
Analysis Period (min)		15										
c	Critical Lane Group											

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 AM

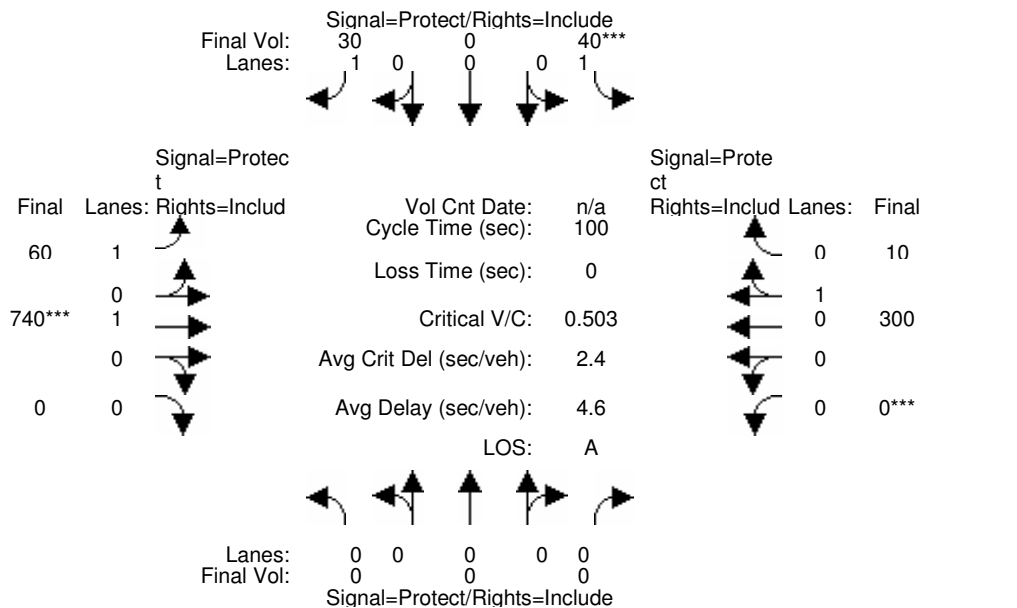
Intersection #117: MIT-Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	60	0	70	20	130	0	0	850	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	60	0	70	20	130	0	0	850	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	60	0	70	20	130	0	0	850	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	60	0	70	20	130	0	0	850	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	60	0	70	20	130	0	0	850	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	60	0	70	20	130	0	0	850	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.99	0.01
Final Sat.:	0	0	0	1550	0	1550	1550	1550	0	0	1532	18
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.04	0.00	0.05	0.01	0.08	0.00	0.00	0.55	0.55
Crit Volume:	0					70	20				860	
Crit Moves:						****	****				****	

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 PM

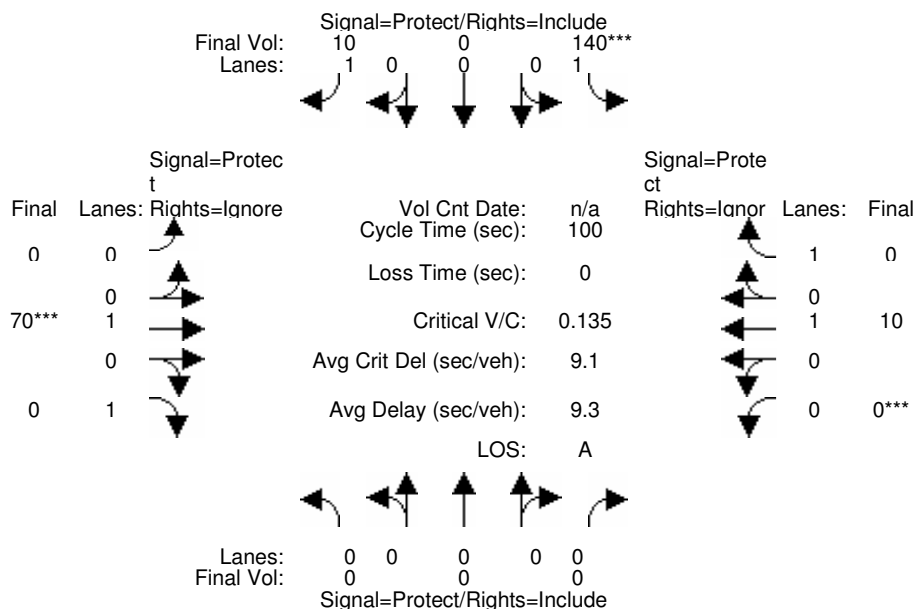
Intersection #117: MIT-Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	40	0	30	60	740	0	0	300	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	40	0	30	60	740	0	0	300	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	40	0	30	60	740	0	0	300	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	40	0	30	60	740	0	0	300	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	40	0	30	60	740	0	0	300	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	40	0	30	60	740	0	0	300	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.97	0.03
Final Sat.:	0	0	0	1550	0	1550	1550	1550	0	0	1500	50
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.03	0.00	0.02	0.04	0.48	0.00	0.00	0.20	0.20
Crit Volume:				40			740			0		
Crit Moves:				***			***			***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 AM

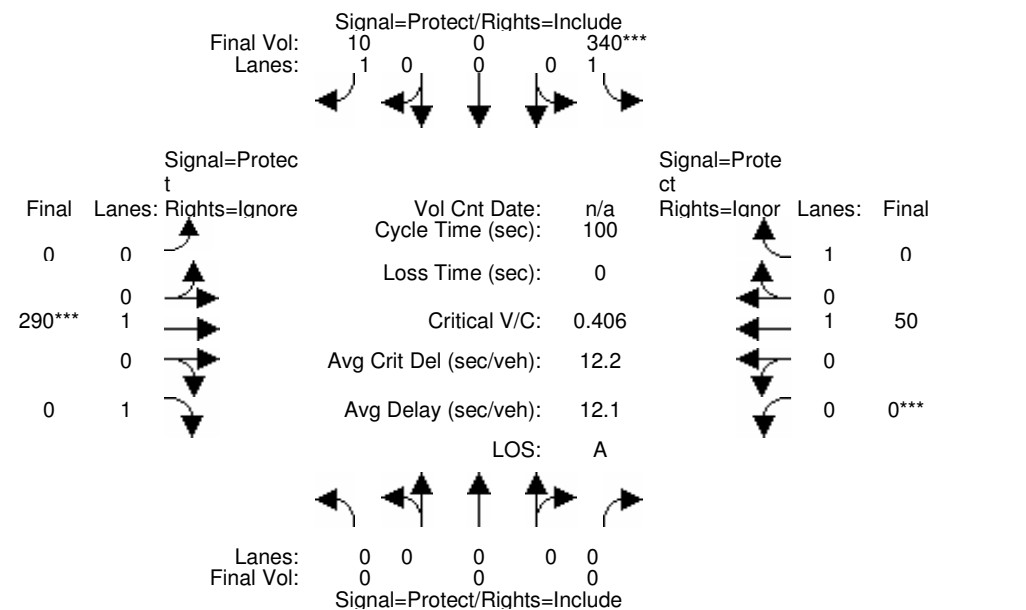
Intersection #121: MIT-Elkhorn Boulevard / SR 70 / SR 99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	140	0	10	0	70	10	0	10	870
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	140	0	10	0	70	10	0	10	870
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	140	0	10	0	70	10	0	10	870
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	140	0	10	0	70	0	0	10	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	140	0	10	0	70	0	0	10	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	140	0	10	0	70	0	0	10	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	1550	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.09	0.00	0.01	0.00	0.05	0.00	0.00	0.01	0.00
Crit Volume:	0			140			70			0		
Crit Moves:	***			***			***			***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 PM

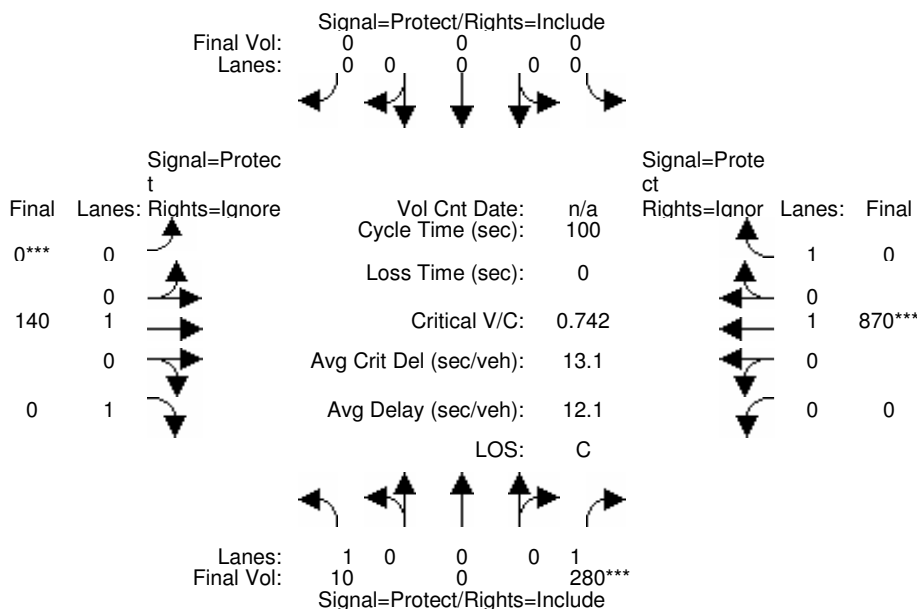
Intersection #121: MIT-Elkhorn Boulevard / SR 70 / SR 99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	340	0	10	0	290	30	0	50	360
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	340	0	10	0	290	30	0	50	360
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	340	0	10	0	290	30	0	50	360
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	340	0	10	0	290	0	0	50	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	340	0	10	0	290	0	0	50	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	340	0	10	0	290	0	0	50	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	1550	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.22	0.00	0.01	0.00	0.19	0.00	0.00	0.03	0.00
Crit Volume:	0			340			290			0		
Crit Moves:				****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 AM

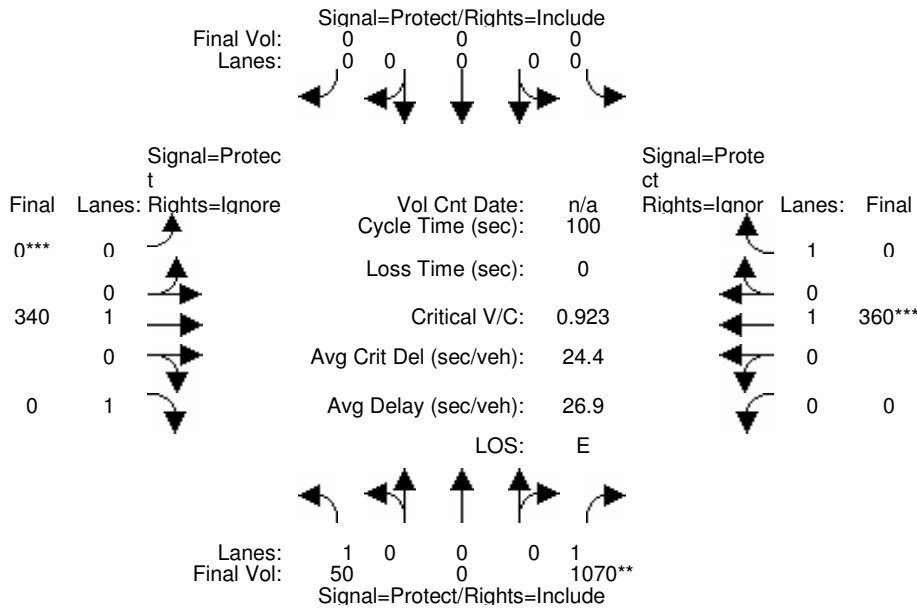
Intersection #122: MIT-Elkhorn Boulevard / SR70 / SR 99 NB Ramps



Street Name:	SR70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	0	280	0	0	0	0	140	70	0	870	210
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	0	280	0	0	0	0	140	70	0	870	210
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	0	280	0	0	0	0	140	70	0	870	210
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	10	0	280	0	0	0	0	140	0	0	870	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	0	280	0	0	0	0	140	0	0	870	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	10	0	280	0	0	0	0	140	0	0	870	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.01	0.00	0.18	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.56	0.00
Crit Volume:			280	0					0		870	
Crit Moves:			***						****		***	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Phase 1 PM

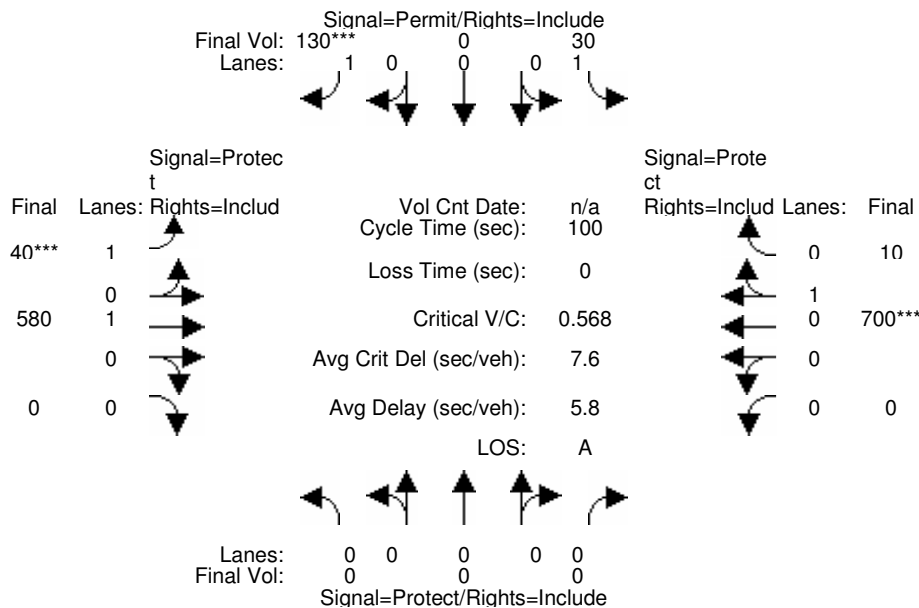
Intersection #122: MIT-Elkhorn Boulevard / SR70 / SR 99 NB Ramps



Street Name:	SR70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	50	0	1070	0	0	0	0	340	290	0	360	220
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	50	0	1070	0	0	0	0	340	290	0	360	220
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	50	0	1070	0	0	0	0	340	290	0	360	220
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	50	0	1070	0	0	0	0	340	0	0	360	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	50	0	1070	0	0	0	0	340	0	0	360	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	50	0	1070	0	0	0	0	340	0	0	360	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.69	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.23	0.00
Crit Volume:			1070	0			0			360		
Crit Moves:			***				****			***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Phase 1 AM

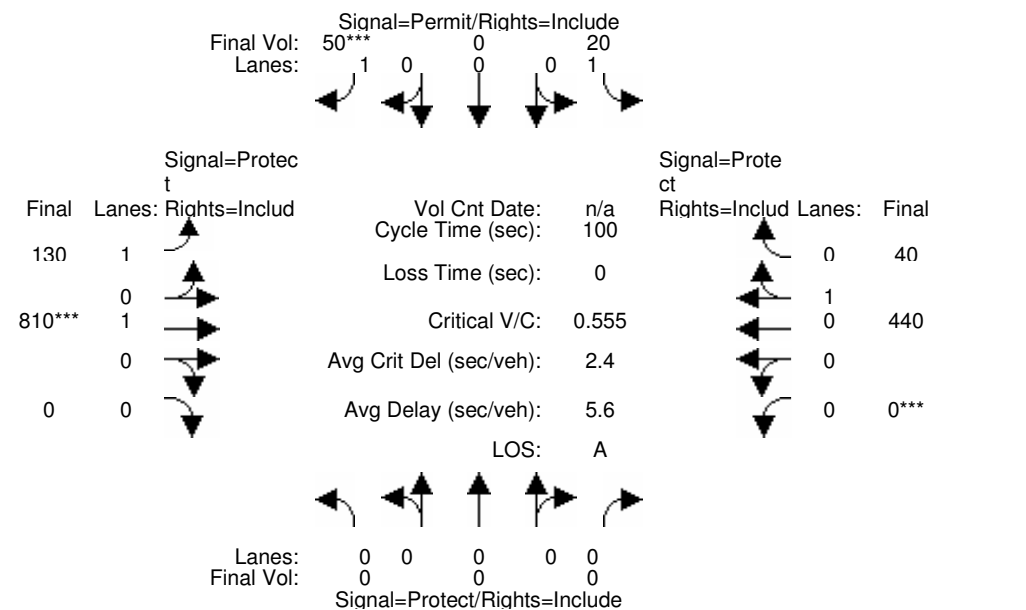
Intersection #124: MIT-Elkhorn Boulevard / East Levee Boulevard



Street Name:	East Levee Boulevard						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	30	0	130	40	580	0	0	700	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	30	0	130	40	580	0	0	700	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	30	0	130	40	580	0	0	700	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	30	0	130	40	580	0	0	700	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	30	0	130	40	580	0	0	700	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	30	0	130	40	580	0	0	700	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.99	0.01
Final Sat.:	0	0	0	1550	0	1550	1550	1550	0	0	1528	22
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.08	0.03	0.37	0.00	0.00	0.46	0.46
Crit Volume:	0					130	40			710		
Crit Moves:						****	****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Phase 1 PM

Intersection #124: MIT-Elkhorn Boulevard / East Levee Boulevard



Street Name:	East Levee Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	20	0	50	130	810	0	0	440	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	20	0	50	130	810	0	0	440	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	20	0	50	130	810	0	0	440	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	20	0	50	130	810	0	0	440	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	20	0	50	130	810	0	0	440	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	20	0	50	130	810	0	0	440	40
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.92	0.08
Final Sat.:	0	0	0	1550	0	1550	1550	1550	0	0	1421	129
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.01	0.00	0.03	0.08	0.52	0.00	0.00	0.31	0.31
Crit Volume:	0					50	810			0		
Crit Moves:						****	****			****		

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3610 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 2000 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3610	2000	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	981	543	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.889 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 4414 2228 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4414$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4414	4700	No
Fi F			
$v = v - v$	2186	4700	No
FO F R			
v	2228	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4414	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 24.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.499$
S
Space mean speed in ramp influence area, $S = 53.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 53.5$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	1610 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	35.0 mph
Volume on ramp	10 vph
Length of first accel/decel lane	590 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1610	10	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	437	3	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1969	11	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1969$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	1980	4700	No
FO			
v	1980	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.308
S
Space mean speed in ramp influence area, S = 57.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.9 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego DIAG ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1620 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 40 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	1620	40	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	440	11	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1981	45	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1981 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2026	4700	No
FO			
v	2026	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.6 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.309
S
Space mean speed in ramp influence area, S = 57.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.9 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2710 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1170 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2710	1170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	736	318	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3063	1304	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3063$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3063	4700	No
Fi F			
$v = v - v$	1759	4700	No
FO F R			
v	1304	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3063	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 12.6$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.415$
S
Space mean speed in ramp influence area, $S = 55.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.4$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Loop On
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1540 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 880 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1540	880	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	418	239	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1741	980	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1741$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2721	4700	No
FO			
v	2721	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.339
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.2 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego DiagOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2420 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 700 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2420	700	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	658	190	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2736	780	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2736 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	3516	4700	No
FO			
v	3516	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.8 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.411
S
Space mean speed in ramp influence area, S = 55.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.5 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3680 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1740 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3680	1740	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	948	448	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3946		1839		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3946$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3946	4700	No
Fi F			
$v = v - v$	2107	4700	No
FO F R			
v	1839	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3946	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 20.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.464$
S
Space mean speed in ramp influence area, $S = 54.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.3$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1940 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 410 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1940	410	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	500	106	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2080	433	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2080$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2513	4700	No
FO			
v	2513	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.328
S
Space mean speed in ramp influence area, S = 57.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.5 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego DIAG ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2350 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 300 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2350	300	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	606	77	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2520	317	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2520 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2837	4700	No
FO			
v	2837	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.8 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.346
S
Space mean speed in ramp influence area, S = 57.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.0 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1810 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1810	570	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	466	147	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 1978 602 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1978$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1978	4700	No
Fi F			
$v = v - v$	1376	4700	No
FO F R			
v	602	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1978	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 3.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, $D = 0.352$
S
Space mean speed in ramp influence area, $S = 56.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego LoopOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1240 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 1020 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	1240	1020	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	320	263	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1355	1078	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1355 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2433	4700	No
FO			
v	2433	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.3 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.324
S
Space mean speed in ramp influence area, S = 57.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.5 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego DiagOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2260 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 1740 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2260	1740	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	582	448	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2470	1839	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2470$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4309	4700	No
FO			
v	4309	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D





























Speed Estimation

Intermediate speed variable, M = 0.570
S
Space mean speed in ramp influence area, S = 51.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.9 mph

**EXISTING CONDITIONS
PLUS PROJECT
WITH MITIGATION MEASURES**

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Existing Plus Project With Mitigation AM

												
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
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	4150	1583	1770	4803	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	4150	1583	1770	4803	1583
Volume (vph)	10	10	10	580	10	100	10	880	770	530	2120	10
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)	11	11	11	630	11	109	11	957	837	576	2304	11
RTOR Reduction (vph)	0	10	0	0	0	82	0	0	0	0	0	3
Lane Group Flow (vph)	11	12	0	630	11	27	11	957	837	576	2304	8
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		Perm	Prot		Free	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			Free			6
Actuated Green, G (s)	1.5	7.5		27.2	33.2	33.2	1.5	36.8	135.8	48.3	83.6	83.6
Effective Green, g (s)	1.5	7.5		27.2	33.2	33.2	1.5	36.8	135.8	48.3	83.6	83.6
Actuated g/C Ratio	0.01	0.06		0.20	0.24	0.24	0.01	0.27	1.00	0.36	0.62	0.62
Clearance Time (s)	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
Lane Grp Cap (vph)	20	95		688	455	387	20	1125	1583	630	2957	975
v/s Ratio Prot	0.01	0.01		c0.18	0.01		0.01	c0.23		c0.33	0.48	
v/s Ratio Perm						0.02			c0.53			0.01
v/c Ratio	0.55	0.12		0.92	0.02	0.07	0.55	0.85	0.53	0.91	0.78	0.01
Uniform Delay, d1	66.8	61.0		53.2	39.0	39.4	66.8	46.9	0.0	41.8	19.3	10.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.9	0.6		16.8	0.0	0.1	28.9	6.3	1.3	17.8	1.4	0.0
Delay (s)	95.7	61.6		70.0	39.0	39.5	95.7	53.2	1.3	59.6	20.6	10.1
Level of Service	F	E		E	D	D	F	D	A	E	C	B
Approach Delay (s)		73.0			65.1			29.4			28.4	
Approach LOS		E			E			C			C	

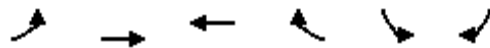
Intersection Summary

HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	135.8	Sum of lost time (s)	4.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
Existing Plus Project With Mitigation AM



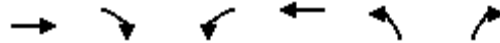
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	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)	10	700	1220	80	70	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	761	1326	87	76	87
RTOR Reduction (vph)	0	0	0	43	0	71
Lane Group Flow (vph)	11	761	1326	44	76	16
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	0.6	25.0	20.4	20.4	7.4	7.4
Effective Green, g (s)	0.6	25.0	20.4	20.4	7.4	7.4
Actuated g/C Ratio	0.01	0.62	0.50	0.50	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)	26	2190	1787	799	324	290
v/s Ratio Prot	0.01	c0.22	c0.37		c0.04	
v/s Ratio Perm				0.03		0.01
v/c Ratio	0.42	0.35	0.74	0.05	0.23	0.05
Uniform Delay, d1	19.7	3.7	7.9	5.1	14.1	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	0.1	1.7	0.0	0.4	0.1
Delay (s)	30.5	3.8	9.6	5.1	14.5	13.7
Level of Service	C	A	A	A	B	B
Approach Delay (s)		4.2	9.3		14.0	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	40.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM





























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	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Volume (vph)	600	170	70	850	450	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	652	185	76	924	489	22
RTOR Reduction (vph)	0	124	0	0	0	14
Lane Group Flow (vph)	652	61	76	924	489	8
Turn Type		Perm	Prot		Perm	
Protected Phases	2		1	6	4	
Permitted Phases		2				4
Actuated Green, G (s)	15.3	15.3	2.4	21.7	17.0	17.0
Effective Green, g (s)	15.3	15.3	2.4	21.7	17.0	17.0
Actuated g/C Ratio	0.33	0.33	0.05	0.46	0.36	0.36
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)	1159	519	91	1644	644	576
v/s Ratio Prot	0.18		0.04	c0.26	c0.28	
v/s Ratio Perm		0.04				0.01
v/c Ratio	0.56	0.12	0.84	0.56	0.76	0.01
Uniform Delay, d1	12.9	11.0	22.0	9.1	13.1	9.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	45.3	0.4	5.1	0.0
Delay (s)	13.6	11.1	67.3	9.5	18.2	9.5
Level of Service	B	B	E	A	B	A
Approach Delay (s)	13.0			13.9	17.8	
Approach LOS	B			B	B	

Intersection Summary

HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

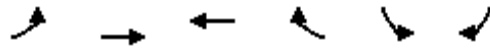
HCM Signalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM

												
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	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1789		1770	1723	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1789		1770	1723	
Volume (vph)	10	600	10	90	890	130	20	110	40	100	10	10
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)	11	652	11	98	967	141	22	120	43	109	11	11
RTOR Reduction (vph)	0	0	7	0	0	86	0	21	0	0	8	0
Lane Group Flow (vph)	11	652	4	98	967	55	22	142	0	109	14	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						
Actuated Green, G (s)	0.6	18.1	18.1	4.3	21.8	21.8	0.6	13.3		4.3	17.0	
Effective Green, g (s)	0.6	18.1	18.1	4.3	21.8	21.8	0.6	13.3		4.3	17.0	
Actuated g/C Ratio	0.01	0.32	0.32	0.08	0.39	0.39	0.01	0.24		0.08	0.30	
Clearance Time (s)	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	
Lane Grp Cap (vph)	19	1144	512	136	1378	616	19	425		136	523	
v/s Ratio Prot	0.01	0.18		c0.06	c0.27		0.01	c0.08		c0.06	c0.01	
v/s Ratio Perm			0.00			0.03						
v/c Ratio	0.58	0.57	0.01	0.72	0.70	0.09	1.16	0.34		0.80	0.03	
Uniform Delay, d1	27.6	15.7	12.9	25.3	14.4	10.8	27.7	17.7		25.4	13.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.3	0.7	0.0	17.1	1.6	0.1	260.5	0.5		27.7	0.0	
Delay (s)	63.9	16.4	12.9	42.3	16.0	10.9	288.2	18.2		53.2	13.7	
Level of Service	E	B	B	D	B	B	F	B		D	B	
Approach Delay (s)		17.1			17.5			50.3			46.5	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM Average Control Delay			21.9				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			56.0				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			55.0%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM



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	0.95	0.95	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	3539	1583	1722	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	3539	1583	1722	
Volume (vph)	10	610	1100	10	20	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	663	1196	11	22	11
RTOR Reduction (vph)	0	0	0	2	11	0
Lane Group Flow (vph)	11	663	1196	9	22	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		7	
Permitted Phases				6		
Actuated Green, G (s)	1.5	75.1	69.6	69.6	1.5	
Effective Green, g (s)	1.5	75.1	69.6	69.6	1.5	
Actuated g/C Ratio	0.02	0.89	0.82	0.82	0.02	
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)	31	3142	2912	1302	31	
v/s Ratio Prot	0.01	c0.19	c0.34		c0.01	
v/s Ratio Perm				0.01		
v/c Ratio	0.35	0.21	0.41	0.01	0.72	
Uniform Delay, d1	41.1	0.7	2.0	1.3	41.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.9	0.0	0.1	0.0	56.3	
Delay (s)	47.9	0.7	2.1	1.3	97.6	
Level of Service	D	A	A	A	F	
Approach Delay (s)		1.5	2.1		97.6	
Approach LOS		A	A		F	

Intersection Summary

HCM Average Control Delay	3.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			























HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM

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
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3471		1770	3539	1583	1770	3539	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3471		1770	3539	1583	1770	3539	1583	1770	1863	1583
Volume (vph)	300	270	40	270	630	80	20	510	280	40	400	640
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)	326	293	43	293	685	87	22	554	304	43	435	696
RTOR Reduction (vph)	0	15	0	0	0	63	0	0	215	0	0	52
Lane Group Flow (vph)	326	321	0	293	685	24	22	554	89	43	435	644
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases						6			4			8
Actuated Green, G (s)	15.2	20.8		13.7	19.3	19.3	1.1	20.4	20.4	1.7	21.0	36.2
Effective Green, g (s)	15.2	22.8		13.7	21.3	21.3	1.1	22.4	22.4	1.7	23.0	38.2
Actuated g/C Ratio	0.20	0.30		0.18	0.28	0.28	0.01	0.29	0.29	0.02	0.30	0.50
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	2.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	2.0
Lane Grp Cap (vph)	351	1033		317	984	440	25	1035	463	39	559	872
v/s Ratio Prot	c0.18	0.09		0.17	c0.19		0.01	0.16		c0.02	0.23	c0.15
v/s Ratio Perm						0.02			0.06			0.26
v/c Ratio	0.93	0.31		0.92	0.70	0.05	0.88	0.54	0.19	1.10	0.78	0.74
Uniform Delay, d1	30.2	20.8		30.9	24.8	20.3	37.7	22.7	20.3	37.4	24.5	15.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.7	0.3		31.0	2.6	0.1	124.9	0.9	0.4	176.2	7.7	2.9
Delay (s)	59.9	21.2		62.0	27.4	20.4	162.6	23.7	20.7	213.6	32.2	18.1
Level of Service	E	C		E	C	C	F	C	C	F	C	B
Approach Delay (s)		40.2			36.3			26.1			30.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM Average Control Delay			32.8									HCM Level of Service C
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			76.6									Sum of lost time (s) 12.0
Intersection Capacity Utilization			71.8%									ICU Level of Service C
Analysis Period (min)			15									
c	Critical Lane Group											

























HCM Signalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM

												
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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1831		1770	1806	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1831		1770	1806	
Volume (vph)	10	20	10	30	60	750	20	80	10	210	40	10
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)	11	22	11	33	65	815	22	87	11	228	43	11
RTOR Reduction (vph)	0	0	9	0	0	634	0	8	0	0	6	0
Lane Group Flow (vph)	11	22	2	33	65	181	22	90	0	228	48	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	0.5	10.2	10.2	1.3	11.0	11.0	0.5	12.3		9.6	21.4	
Effective Green, g (s)	0.5	10.2	10.2	1.3	11.0	11.0	0.5	12.3		9.6	21.4	
Actuated g/C Ratio	0.01	0.21	0.21	0.03	0.22	0.22	0.01	0.25		0.19	0.43	
Clearance Time (s)	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	
Lane Grp Cap (vph)	18	385	327	47	415	352	18	456		344	782	
v/s Ratio Prot	0.01	0.01		c0.02	0.03		0.01	c0.05		c0.13	0.03	
v/s Ratio Perm			0.00			c0.11						
v/c Ratio	0.61	0.06	0.01	0.70	0.16	0.52	1.22	0.20		0.66	0.06	
Uniform Delay, d1	24.4	15.7	15.6	23.9	15.5	16.9	24.4	14.7		18.4	8.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.7	0.1	0.0	38.0	0.2	1.3	289.8	0.2		4.7	0.0	
Delay (s)	73.0	15.8	15.6	61.8	15.6	18.1	314.2	14.9		23.2	8.2	
Level of Service	E	B	B	E	B	B	F	B		C	A	
Approach Delay (s)		30.1			19.5			69.8			20.3	
Approach LOS		C			B			E			C	
Intersection Summary												
HCM Average Control Delay			24.5				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			49.4				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			64.6%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 15: Elverta Rd & Hwy 99

















Sutter Pointe EIR
 Existing Plus Project With Mitigation AM

													
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	0.94	1.00	1.00	0.97	0.86	1.00	0.97	0.86	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	4990	1863	1583	3433	5229	1583	3433	6052	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1863	1583	4990	1863	1583	3433	5229	1583	3433	6052	1583	
Volume (vph)	10	20	200	430	90	40	650	2950	80	70	2590	30	
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)	11	22	217	467	98	43	707	3207	87	76	2815	33	
RTOR Reduction (vph)	0	0	0	0	0	35	0	0	0	0	0	9	
Lane Group Flow (vph)	11	22	217	467	98	8	707	3207	87	76	2815	24	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%	
Turn Type	Prot		Free	Prot		Perm	Prot		Free	Prot		Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			Free			8			Free			6	
Actuated Green, G (s)	1.2	7.5	111.7	15.3	21.6	21.6	20.5	68.8	111.7	4.1	52.4	52.4	
Effective Green, g (s)	1.2	7.5	111.7	15.3	21.6	21.6	20.5	68.8	111.7	4.1	52.4	52.4	
Actuated g/C Ratio	0.01	0.07	1.00	0.14	0.19	0.19	0.18	0.62	1.00	0.04	0.47	0.47	
Clearance Time (s)	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	
Lane Grp Cap (vph)	19	125	1583	684	360	306	630	3221	1583	126	2839	743	
v/s Ratio Prot	0.01	0.01		c0.09	c0.05		c0.21	c0.61		0.02	0.47		
v/s Ratio Perm			0.14			0.01			0.05			0.02	
v/c Ratio	0.58	0.18	0.14	0.68	0.27	0.03	1.12	1.00	0.05	0.60	0.99	0.03	
Uniform Delay, d1	55.0	49.2	0.0	45.9	38.4	36.5	45.6	21.3	0.0	53.0	29.4	16.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	36.3	0.7	0.2	2.8	0.4	0.0	74.4	14.7	0.1	7.9	14.9	0.0	
Delay (s)	91.3	49.9	0.2	48.7	38.8	36.6	120.0	36.1	0.1	60.9	44.3	16.0	
Level of Service	F	D	A	D	D	D	F	D	A	E	D	B	
Approach Delay (s)		8.6			46.2			50.1			44.4		
Approach LOS		A			D			D			D		
Intersection Summary													
HCM Average Control Delay			46.3		HCM Level of Service						D		
HCM Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			111.7		Sum of lost time (s)						8.0		
Intersection Capacity Utilization			80.9%		ICU Level of Service						D		
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM

												
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	140	10	0	460	480	0	0	50	0	0	20
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	152	11	0	500	522	0	0	54	0	0	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None				None	
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.44						0.44	0.44		0.44	0.44	0.44
vC, conflicting volume	1022			163			940	1179	158	973	924	761
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1049			163			865	1405	158	939	828	460
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			100			100	100	94	100	100	92
cM capacity (veh/h)	294			1416			111	62	888	102	136	266
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	163	1022	54	22								
Volume Left	0	0	0	0								
Volume Right	11	522	54	22								
cSH	1700	1700	888	266								
Volume to Capacity	0.10	0.60	0.06	0.08								
Queue Length 95th (ft)	0	0	5	7								
Control Delay (s)	0.0	0.0	9.3	19.7								
Lane LOS			A	C								
Approach Delay (s)	0.0	0.0	9.3	19.7								
Approach LOS			A	C								
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			63.6%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM



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
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1860		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1860		1770	1583
Volume (vph)	40	160	990	10	110	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	174	1076	11	120	76
RTOR Reduction (vph)	0	0	0	0	0	64
Lane Group Flow (vph)	43	174	1087	0	120	12
Turn Type	Prot			Perm		
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	1.9	50.6	44.7		10.7	10.7
Effective Green, g (s)	1.9	50.6	44.7		10.7	10.7
Actuated g/C Ratio	0.03	0.73	0.65		0.15	0.15
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)	49	1360	1200		273	244
v/s Ratio Prot	c0.02	0.09	c0.58		c0.07	
v/s Ratio Perm						0.01
v/c Ratio	0.88	0.13	0.91		0.44	0.05
Uniform Delay, d1	33.6	2.8	10.5		26.6	25.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	83.1	0.0	9.8		1.1	0.1
Delay (s)	116.7	2.8	20.3		27.7	25.0
Level of Service	F	A	C		C	C
Approach Delay (s)		25.4	20.3		26.7	
Approach LOS		C	C		C	

Intersection Summary

HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	69.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM



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
Lane Util. Factor		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	0.85	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)		1863	1583		1863	1583				1770	1583	1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)		1863	1583		1863	1583				1770	1583	1583
Volume (vph)	0	90	10	0	80	870	0	0	0	160	0	10
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	98	11	0	87	946	0	0	0	174	0	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	98	11	0	87	946	0	0	0	174	0	3
Turn Type		Free			Free					Prot	custom	
Protected Phases		2			6					8		
Permitted Phases		Free			Free						8	
Actuated Green, G (s)		25.6	45.8		25.6	45.8				12.2	12.2	12.2
Effective Green, g (s)		25.6	45.8		25.6	45.8				12.2	12.2	12.2
Actuated g/C Ratio		0.56	1.00		0.56	1.00				0.27	0.27	0.27
Clearance Time (s)		4.0			4.0					4.0		
Vehicle Extension (s)		3.0			3.0					3.0		
Lane Grp Cap (vph)		1041	1583		1041	1583				471	422	422
v/s Ratio Prot		0.05			0.05					0.10		
v/s Ratio Perm			0.01			c0.60						0.00
v/c Ratio		0.09	0.01		0.08	0.60				0.37	0.01	0.01
Uniform Delay, d1		4.7	0.0		4.7	0.0				13.7	12.3	12.3
Progression Factor		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2		0.0	0.0		0.0	1.7				0.5	0.0	0.0
Delay (s)		4.7	0.0		4.7	1.7				14.2	12.4	12.4
Level of Service		A	A		A	A				B	B	B
Approach Delay (s)		4.3			1.9			0.0		14.1		
Approach LOS		A			A			A		B		

Intersection Summary

HCM Average Control Delay	3.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	45.8	Sum of lost time (s)	0.0
Intersection Capacity Utilization	20.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM



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	1.00		1.00	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		1863	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		1863	1583	1770		1583			
Volume (vph)	0	160	90	0	890	330	60	0	280	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)	0	174	98	0	967	359	65	0	304	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	250	0	0	0
Lane Group Flow (vph)	0	174	98	0	967	359	65	0	54	0	0	0
Turn Type		Free			Free		Prot		custom			
Protected Phases		2			6		4					
Permitted Phases		Free			Free				4			
Actuated Green, G (s)		31.9	48.5		31.9	48.5	8.6		8.6			
Effective Green, g (s)		31.9	48.5		31.9	48.5	8.6		8.6			
Actuated g/C Ratio		0.66	1.00		0.66	1.00	0.18		0.18			
Clearance Time (s)		4.0			4.0		4.0		4.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		1225	1583		1225	1583	314		281			
v/s Ratio Prot		0.09			c0.52		0.04					
v/s Ratio Perm			0.06			c0.23			0.03			
v/c Ratio		0.14	0.06		0.79	0.23	0.21		0.19			
Uniform Delay, d1		3.1	0.0		5.9	0.0	17.0		17.0			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		0.1	0.1		3.5	0.3	0.3		0.3			
Delay (s)		3.2	0.1		9.4	0.3	17.4		17.3			
Level of Service		A	A		A	A	B		B			
Approach Delay (s)		2.1			6.9			17.3			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay		8.2			HCM Level of Service				A			
HCM Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		48.5			Sum of lost time (s)				4.0			
Intersection Capacity Utilization		56.8%			ICU Level of Service				B			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Pointe EIR
 Existing Plus Project With Mitigation AM



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
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	1809		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1809		1770	1583
Volume (vph)	100	580	700	190	30	130
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	630	761	207	33	141
RTOR Reduction (vph)	0	0	11	0	0	124
Lane Group Flow (vph)	109	630	957	0	33	17
Turn Type	Prot			custom		
Protected Phases	7	4	8		1	
Permitted Phases						6
Actuated Green, G (s)	4.3	46.2	37.9		7.3	7.3
Effective Green, g (s)	4.3	46.2	37.9		7.3	7.3
Actuated g/C Ratio	0.07	0.75	0.62		0.12	0.12
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)	124	1400	1115		210	188
v/s Ratio Prot	c0.06	0.34	c0.53		c0.02	
v/s Ratio Perm						0.01
v/c Ratio	0.88	0.45	0.86		0.16	0.09
Uniform Delay, d1	28.3	2.9	9.6		24.3	24.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	45.5	0.2	6.7		0.4	0.2
Delay (s)	73.8	3.1	16.3		24.7	24.3
Level of Service	E	A	B		C	C
Approach Delay (s)		13.5	16.3		24.4	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	61.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Pointe EIR
Existing Plus Project AM With Mitigation















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
Lane Util. Factor		0.86	1.00		0.81	0.81				0.97		0.76
Frt		1.00	0.85		1.00	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		6408	1583		6035	1282				3433		3610
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		6408	1583		6035	1282				3433		3610
Volume (vph)	0	610	700	0	2390	880	0	0	0	160	0	1010
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	663	761	0	2598	957	0	0	0	174	0	1098
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	0	663	761	0	2598	957	0	0	0	174	0	1096
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					8		
Permitted Phases			Free			Free						8
Actuated Green, G (s)		69.9	120.0		69.9	120.0				42.1		42.1
Effective Green, g (s)		69.9	120.0		69.9	120.0				42.1		42.1
Actuated g/C Ratio		0.58	1.00		0.58	1.00				0.35		0.35
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		3733	1583		3515	1282				1204		1267
v/s Ratio Prot		0.10			0.43					0.05		
v/s Ratio Perm			0.48			c0.75						c0.30
v/c Ratio		0.18	0.48		0.74	0.75				0.14		0.87
Uniform Delay, d1		11.7	0.0		18.4	0.0				26.6		36.3
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.1	1.0		1.4	4.0				0.1		6.4
Delay (s)		11.8	1.0		19.8	4.0				26.7		42.7
Level of Service		B	A		B	A				C		D
Approach Delay (s)		6.0			15.5		0.0				40.5	
Approach LOS		A			B		A				D	

Intersection Summary

HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Pointe EIR
Existing Plus Project AM With Mitigation

												
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		0.81	0.81		0.86	1.00	0.94		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		6035	1282		6408	1583	4990		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		6035	1282		6408	1583	4990		1583			
Volume (vph)	0	760	10	0	2290	40	980	0	1020	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)	0	826	11	0	2489	43	1065	0	1109	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	826	11	0	2489	43	1065	0	1109	0	0	0
Turn Type		Free			Free		Prot		Free			
Protected Phases		2			6		4					
Permitted Phases		Free			Free				Free			
Actuated Green, G (s)		81.6	120.0		81.6	120.0	30.4		120.0			
Effective Green, g (s)		81.6	120.0		81.6	120.0	30.4		120.0			
Actuated g/C Ratio		0.68	1.00		0.68	1.00	0.25		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		4104	1282		4357	1583	1264		1583			
v/s Ratio Prot		0.14			0.39		c0.21					
v/s Ratio Perm			0.01			0.03			c0.70			
v/c Ratio		0.20	0.01		0.57	0.03	0.84		0.70			
Uniform Delay, d1		7.1	0.0		10.0	0.0	42.5		0.0			
Progression Factor		1.00	1.00		0.84	1.00	1.00		1.00			
Incremental Delay, d2		0.1	0.0		0.4	0.0	5.3		2.6			
Delay (s)		7.2	0.0		8.9	0.0	47.8		2.6			
Level of Service		A	A		A	A	D		A			
Approach Delay (s)		7.1			8.7			24.8			0.0	
Approach LOS		A			A			C			A	
Intersection Summary												
HCM Average Control Delay		14.8			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.74										
Actuated Cycle Length (s)		120.0			Sum of lost time (s)			4.0				
Intersection Capacity Utilization		58.5%			ICU Level of Service			B				
Analysis Period (min)		15										
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Point EIR
Existing Plus Project With Mitigation PM

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
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	4150	1583	1770	4803	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	4150	1583	1770	4803	1583
Volume (vph)	10	10	10	840	10	460	10	1910	730	130	960	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	10	866	10	474	10	1969	753	134	990	10
RTOR Reduction (vph)	0	9	0	0	0	97	0	0	0	0	0	4
Lane Group Flow (vph)	10	11	0	866	10	377	10	1969	753	134	990	6
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		Perm	Prot		Free	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			Free			6
Actuated Green, G (s)	1.5	7.8		35.2	41.5	41.5	0.7	68.6	138.7	11.1	79.0	79.0
Effective Green, g (s)	1.5	7.8		35.2	41.5	41.5	0.7	68.6	138.7	11.1	79.0	79.0
Actuated g/C Ratio	0.01	0.06		0.25	0.30	0.30	0.01	0.49	1.00	0.08	0.57	0.57
Clearance Time (s)	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
Lane Grp Cap (vph)	19	97		871	557	474	9	2053	1583	142	2736	902
v/s Ratio Prot	0.01	0.01		c0.25	0.01		0.01	c0.47		c0.08	0.21	
v/s Ratio Perm						c0.24			c0.48			0.00
v/c Ratio	0.53	0.11		0.99	0.02	0.80	1.11	0.96	0.48	0.94	0.36	0.01
Uniform Delay, d1	68.2	62.1		51.6	34.2	44.7	69.0	33.7	0.0	63.5	16.2	12.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.9	0.5		28.9	0.0	9.0	342.2	11.6	1.0	58.2	0.1	0.0
Delay (s)	92.1	62.6		80.5	34.3	53.7	411.2	45.3	1.0	121.7	16.3	12.9
Level of Service	F	E		F	C	D	F	D	A	F	B	B
Approach Delay (s)		72.5			70.8			34.4			28.7	
Approach LOS		E			E			C			C	

Intersection Summary

HCM Average Control Delay	42.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	138.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Riego Rd & Pleasant Grove (N)

Sutter Point EIR
Existing Plus Project With Mitigation PM



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	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)	70	1390	790	80	50	30
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	1433	814	82	52	31
RTOR Reduction (vph)	0	0	0	44	0	26
Lane Group Flow (vph)	72	1433	814	38	52	5
Turn Type	Prot		Perm		Perm	
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	1.7	23.2	17.5	17.5	6.7	6.7
Effective Green, g (s)	1.7	23.2	17.5	17.5	6.7	6.7
Actuated g/C Ratio	0.04	0.61	0.46	0.46	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)	79	2166	1634	731	313	280
v/s Ratio Prot	0.04	c0.40	0.23		c0.03	
v/s Ratio Perm				0.02		0.00
v/c Ratio	0.91	0.66	0.50	0.05	0.17	0.02
Uniform Delay, d1	18.0	4.8	7.1	5.6	13.2	12.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	71.7	0.8	0.2	0.0	0.3	0.0
Delay (s)	89.7	5.6	7.4	5.7	13.5	12.9
Level of Service	F	A	A	A	B	B
Approach Delay (s)		9.6	7.2		13.3	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Point EIR
 Existing Plus Project With Mitigation PM




























	→	↘	↙	←	↖	↗
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	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Volume (vph)	880	560	40	770	100	60
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	907	577	41	794	103	62
RTOR Reduction (vph)	0	334	0	0	0	47
Lane Group Flow (vph)	907	243	41	794	103	15
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	4	
Permitted Phases		2				4
Actuated Green, G (s)	16.6	16.6	1.2	21.8	9.6	9.6
Effective Green, g (s)	16.6	16.6	1.2	21.8	9.6	9.6
Actuated g/C Ratio	0.42	0.42	0.03	0.55	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)	1491	667	54	1958	431	386
v/s Ratio Prot	c0.26		0.02	c0.22	c0.06	
v/s Ratio Perm		0.15				0.01
v/c Ratio	0.61	0.36	0.76	0.41	0.24	0.04
Uniform Delay, d1	8.9	7.8	19.0	5.1	12.0	11.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3	45.2	0.1	0.3	0.0
Delay (s)	9.6	8.1	64.2	5.2	12.3	11.4
Level of Service	A	A	E	A	B	B
Approach Delay (s)	9.0			8.1	11.9	
Approach LOS	A			A	B	

Intersection Summary

HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	39.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Point EIR
 Existing Plus Project With Mitigation PM

												
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	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1597		1770	1852	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1597		1770	1852	
Volume (vph)	10	880	50	40	790	30	10	10	190	250	240	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	907	52	41	814	31	10	10	196	258	247	10
RTOR Reduction (vph)	0	0	35	0	0	20	0	129	0	0	2	0
Lane Group Flow (vph)	10	907	17	41	814	11	10	77	0	258	255	0
Turn Type	Prot		Perm		Prot		Perm		Prot		Prot	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						
Actuated Green, G (s)	0.6	21.2	21.2	2.0	22.6	22.6	0.6	13.3		12.6	25.3	
Effective Green, g (s)	0.6	21.2	21.2	2.0	22.6	22.6	0.6	13.3		12.6	25.3	
Actuated g/C Ratio	0.01	0.33	0.33	0.03	0.35	0.35	0.01	0.20		0.19	0.39	
Clearance Time (s)	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	
Lane Grp Cap (vph)	16	1152	516	54	1229	550	16	326		343	720	
v/s Ratio Prot	0.01	c0.26		c0.02	0.23		0.01	0.05		c0.15	c0.14	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.62	0.79	0.03	0.76	0.66	0.02	0.62	0.24		0.75	0.35	
Uniform Delay, d1	32.1	19.9	15.0	31.3	18.0	14.0	32.1	21.7		24.8	14.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	57.6	3.6	0.0	45.2	1.4	0.0	57.6	0.4		9.0	0.3	
Delay (s)	89.7	23.5	15.0	76.5	19.4	14.0	89.7	22.0		33.8	14.4	
Level of Service	F	C	B	E	B	B	F	C		C	B	
Approach Delay (s)		23.8			21.8			25.2			24.1	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay		23.3			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		65.1			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		67.1%			ICU Level of Service			C				
Analysis Period (min)		15										
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 11: Baseline Rd & Brewer Rd

Sutter Point EIR
 Existing Plus Project With Mitigation PM



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	0.95	0.95	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	3539	3539	1583	1723	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1770	3539	3539	1583	1723	
Volume (vph)	10	1150	780	20	20	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	1186	804	21	21	10
RTOR Reduction (vph)	0	0	0	4	10	0
Lane Group Flow (vph)	10	1186	804	17	21	0
Turn Type	Prot		Perm			
Protected Phases	5	2	6		7	
Permitted Phases				6		
Actuated Green, G (s)	1.9	75.1	69.2	69.2	1.9	
Effective Green, g (s)	1.9	75.1	69.2	69.2	1.9	
Actuated g/C Ratio	0.02	0.88	0.81	0.81	0.02	
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)	40	3127	2881	1289	39	
v/s Ratio Prot	0.01	c0.34	0.23		c0.01	
v/s Ratio Perm				0.01		
v/c Ratio	0.25	0.38	0.28	0.01	0.54	
Uniform Delay, d1	40.8	0.9	1.9	1.5	41.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	0.1	0.1	0.0	14.6	
Delay (s)	44.1	0.9	2.0	1.5	55.7	
Level of Service	D	A	A	A	E	
Approach Delay (s)		1.3	1.9		55.7	
Approach LOS		A	A		E	

Intersection Summary

HCM Average Control Delay	2.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			























HCM Signalized Intersection Capacity Analysis
13: Baseline Rd & Fiddymnt Rd

Sutter Point EIR
Existing Plus Project With Mitigation PM

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
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3486		1770	3539	1583	1770	3539	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3486		1770	3539	1583	1770	3539	1583	1770	1863	1583
Volume (vph)	560	720	80	250	330	160	30	480	290	50	420	350
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	577	742	82	258	340	165	31	495	299	52	433	361
RTOR Reduction (vph)	0	9	0	0	0	111	0	0	220	0	0	89
Lane Group Flow (vph)	577	815	0	258	340	54	31	495	79	52	433	272
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases						6			4			8
Actuated Green, G (s)	25.2	27.5		14.8	17.1	17.1	1.7	20.7	20.7	3.0	22.0	47.2
Effective Green, g (s)	25.2	29.5		14.8	19.1	19.1	1.7	22.7	22.7	3.0	24.0	49.2
Actuated g/C Ratio	0.29	0.34		0.17	0.22	0.22	0.02	0.26	0.26	0.03	0.28	0.57
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	2.0	4.8		2.0	4.8	4.8	2.0	4.8	4.8	2.0	4.8	2.0
Lane Grp Cap (vph)	519	1196		305	786	352	35	934	418	62	520	979
v/s Ratio Prot	c0.33	c0.23		0.15	0.10		0.02	0.14		c0.03	c0.23	0.08
v/s Ratio Perm						0.03			0.05			0.09
v/c Ratio	1.11	0.68		0.85	0.43	0.15	0.89	0.53	0.19	0.84	0.83	0.28
Uniform Delay, d1	30.4	24.2		34.5	28.8	26.9	42.1	27.1	24.5	41.3	29.1	9.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	73.8	2.0		18.3	0.7	0.4	103.6	1.0	0.4	58.2	12.0	0.1
Delay (s)	104.2	26.2		52.8	29.5	27.3	145.7	28.1	24.9	99.4	41.1	9.4
Level of Service	F	C		D	C	C	F	C	C	F	D	A
Approach Delay (s)		58.3			36.9			31.3			31.2	
Approach LOS		E			D			C			C	
Intersection Summary												
HCM Average Control Delay			42.3				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			86.0				Sum of lost time (s)				8.0	
Intersection Capacity Utilization			78.9%				ICU Level of Service				D	
Analysis Period (min)			15									
c Critical Lane Group												

























HCM Signalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Point EIR
 Existing Plus Project With Mitigation PM

												
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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1750		1770	1845	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1750		1770	1845	
Volume (vph)	10	60	90	10	20	490	10	30	20	740	140	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	62	93	10	21	505	10	31	21	763	144	10
RTOR Reduction (vph)	0	0	81	0	0	440	0	18	0	0	2	0
Lane Group Flow (vph)	10	62	12	10	21	65	10	34	0	763	152	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	0.6	9.3	9.3	0.6	9.3	9.3	0.6	11.7		35.0	46.1	
Effective Green, g (s)	0.6	9.3	9.3	0.6	9.3	9.3	0.6	11.7		35.0	46.1	
Actuated g/C Ratio	0.01	0.13	0.13	0.01	0.13	0.13	0.01	0.16		0.48	0.63	
Clearance Time (s)	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	
Lane Grp Cap (vph)	15	239	203	15	239	203	15	282		853	1172	
v/s Ratio Prot	c0.01	0.03		0.01	0.01		0.01	0.02		c0.43	c0.08	
v/s Ratio Perm			0.01			c0.04						
v/c Ratio	0.67	0.26	0.06	0.67	0.09	0.32	0.67	0.12		0.89	0.13	
Uniform Delay, d1	35.9	28.5	27.8	35.9	27.9	28.8	35.9	26.1		17.1	5.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	75.9	0.6	0.1	75.9	0.2	0.9	75.9	0.2		11.8	0.1	
Delay (s)	111.8	29.1	27.9	111.8	28.1	29.7	111.8	26.2		28.9	5.3	
Level of Service	F	C	C	F	C	C	F	C		C	A	
Approach Delay (s)		33.5			31.1			40.0			25.0	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM Average Control Delay			28.3				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			72.6				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			61.6%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 15: Elverta Rd & Hwy 99

Sutter Point EIR
 Existing Plus Project With Mitigation PM

													
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	0.94	1.00	1.00	0.97	0.86	1.00	0.97	0.86	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	4990	1863	1583	3433	5229	1583	3433	6052	1583	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1863	1583	4990	1863	1583	3433	5229	1583	3433	6052	1583	
Volume (vph)	20	70	670	520	30	40	430	2950	600	300	2730	10	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	21	72	691	536	31	41	443	3041	619	309	2814	10	
RTOR Reduction (vph)	0	0	0	0	0	32	0	0	0	0	0	3	
Lane Group Flow (vph)	21	72	691	536	31	9	443	3041	619	309	2814	7	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%	
Turn Type	Prot		Free	Prot		Perm	Prot		Free	Prot		Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			Free			8			Free			6	
Actuated Green, G (s)	3.1	13.5	124.5	17.7	28.1	28.1	14.2	67.1	124.5	10.2	63.1	63.1	
Effective Green, g (s)	3.1	13.5	124.5	17.7	28.1	28.1	14.2	67.1	124.5	10.2	63.1	63.1	
Actuated g/C Ratio	0.02	0.11	1.00	0.14	0.23	0.23	0.11	0.54	1.00	0.08	0.51	0.51	
Clearance Time (s)	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	
Lane Grp Cap (vph)	44	202	1583	709	420	357	392	2818	1583	281	3067	802	
v/s Ratio Prot	0.01	0.04		c0.11	0.02		c0.13	c0.58		0.09	0.46		
v/s Ratio Perm			c0.44			0.01			0.39			0.00	
v/c Ratio	0.48	0.36	0.44	0.76	0.07	0.03	1.13	1.08	0.39	1.10	0.92	0.01	
Uniform Delay, d1	59.9	51.5	0.0	51.3	38.0	37.5	55.1	28.7	0.0	57.1	28.3	15.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.9	1.1	0.9	4.6	0.1	0.0	85.8	42.8	0.7	83.0	4.9	0.0	
Delay (s)	67.8	52.6	0.9	55.9	38.0	37.6	140.9	71.5	0.7	140.2	33.2	15.2	
Level of Service	E	D	A	E	D	D	F	E	A	F	C	B	
Approach Delay (s)		7.4			53.8			68.4			43.7		
Approach LOS		A			D			E			D		
Intersection Summary													
HCM Average Control Delay			52.8		HCM Level of Service						D		
HCM Volume to Capacity ratio			0.92										
Actuated Cycle Length (s)			124.5		Sum of lost time (s)						8.0		
Intersection Capacity Utilization			78.4%		ICU Level of Service						D		
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Point EIR
 Existing Plus Project With Mitigation PM



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	640	60	0	130	410	0	0	100	0	0	520
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	660	62	0	134	423	0	0	103	0	0	536
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)					851							
pX, platoon unblocked	0.81						0.81	0.81		0.81	0.81	0.81
vC, conflicting volume	557			722			1572	1247	691	1139	1067	345
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	456			722			1702	1304	691	1171	1082	197
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			100			100	100	77	100	100	22
cM capacity (veh/h)	900			880			13	131	445	106	177	688
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	722	557	103	536								
Volume Left	0	0	0	0								
Volume Right	62	423	103	536								
cSH	1700	1700	445	688								
Volume to Capacity	0.42	0.33	0.23	0.78								
Queue Length 95th (ft)	0	0	22	189								
Control Delay (s)	0.0	0.0	15.5	26.1								
Lane LOS			C	D								
Approach Delay (s)	0.0	0.0	15.5	26.1								
Approach LOS			C	D								
Intersection Summary												
Average Delay			8.1									
Intersection Capacity Utilization			70.9%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd



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
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1858		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1858		1770	1583
Volume (vph)	140	680	470	10	270	70
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	144	701	485	10	278	72
RTOR Reduction (vph)	0	0	1	0	0	55
Lane Group Flow (vph)	144	701	494	0	278	17
Turn Type	Prot			Perm		
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	5.4	22.3	12.9		9.6	9.6
Effective Green, g (s)	5.4	22.3	12.9		9.6	9.6
Actuated g/C Ratio	0.14	0.56	0.32		0.24	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)	240	1041	601		426	381
v/s Ratio Prot	0.08	c0.38	c0.27		c0.16	
v/s Ratio Perm						0.01
v/c Ratio	0.60	0.67	0.82		0.65	0.05
Uniform Delay, d1	16.2	6.2	12.4		13.6	11.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.0	1.7	8.8		3.6	0.0
Delay (s)	20.2	8.0	21.3		17.2	11.7
Level of Service	C	A	C		B	B
Approach Delay (s)		10.1	21.3		16.1	
Approach LOS		B	C		B	

Intersection Summary

HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	39.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 21: Elkhorn Blvd & Hwy 99 SB Ramps

Sutter Point EIR
 Existing Plus Project With Mitigation PM



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
Lane Util. Factor		1.00	1.00		1.00	1.00				1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)		1863	1583		1863	1583				1770	1770	1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)		1863	1583		1863	1583				1770	1770	1583
Volume (vph)	0	420	130	0	40	360	0	0	0	420	0	20
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	433	134	0	41	371	0	0	0	433	0	21
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	13
Lane Group Flow (vph)	0	433	134	0	41	371	0	0	0	433	0	8
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					8		
Permitted Phases			Free			Free						8
Actuated Green, G (s)		13.9	35.2		13.9	35.2				13.3		13.3
Effective Green, g (s)		13.9	35.2		13.9	35.2				13.3		13.3
Actuated g/C Ratio		0.39	1.00		0.39	1.00				0.38		0.38
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		736	1583		736	1583				669		598
v/s Ratio Prot		c0.23			0.02					c0.24		
v/s Ratio Perm			0.08			0.23						0.01
v/c Ratio		0.59	0.08		0.06	0.23				0.65		0.01
Uniform Delay, d1		8.4	0.0		6.6	0.0				9.0		6.8
Progression Factor		1.00	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		1.2	0.1		0.0	0.3				2.2		0.0
Delay (s)		9.6	0.1		6.6	0.3				11.2		6.9
Level of Service		A	A		A	A				B		A
Approach Delay (s)		7.4			1.0			0.0			11.0	
Approach LOS		A			A			A			B	

Intersection Summary

HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Elkhorn Blvd & Hwy 99 NB Ramps

Sutter Point EIR
Existing Plus Project With Mitigation PM



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	1.00		1.00	1.00	1.00		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		1863	1583		1863	1583	1770		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		1863	1583		1863	1583	1770		1583			
Volume (vph)	0	480	360	0	350	240	50	0	1070	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	495	371	0	361	247	52	0	1103	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0	0	0
Lane Group Flow (vph)	0	495	371	0	361	247	52	0	1065	0	0	0
Turn Type			Free			Free	Prot		custom			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			4			
Actuated Green, G (s)		24.9	89.9		24.9	89.9	57.0		57.0			
Effective Green, g (s)		24.9	89.9		24.9	89.9	57.0		57.0			
Actuated g/C Ratio		0.28	1.00		0.28	1.00	0.63		0.63			
Clearance Time (s)		4.0			4.0		4.0		4.0			
Vehicle Extension (s)		3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)		516	1583		516	1583	1122		1004			
v/s Ratio Prot		c0.27			0.19		0.03					
v/s Ratio Perm			0.23			0.16			c0.67			
v/c Ratio		0.96	0.23		0.70	0.16	0.05		1.06			
Uniform Delay, d1		32.0	0.0		29.1	0.0	6.2		16.5			
Progression Factor		1.00	1.00		1.00	1.00	1.00		1.00			
Incremental Delay, d2		29.2	0.3		4.1	0.2	0.0		46.1			
Delay (s)		61.2	0.3		33.3	0.2	6.2		62.5			
Level of Service		E	A		C	A	A		E			
Approach Delay (s)		35.1			19.8			60.0			0.0	
Approach LOS		D			B			E			A	
Intersection Summary												
HCM Average Control Delay			42.5									HCM Level of Service D
HCM Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			89.9									Sum of lost time (s) 8.0
Intersection Capacity Utilization			98.2%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: Elkhorn Blvd & E. Levee Rd

Sutter Point EIR
 Existing Plus Project With Mitigation PM



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
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1837		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1837		1770	1583
Volume (vph)	130	810	440	50	70	50
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	835	454	52	72	52
RTOR Reduction (vph)	0	0	7	0	0	43
Lane Group Flow (vph)	134	835	499	0	72	9
Turn Type	Prot			custom		
Protected Phases	7	4	8		1	
Permitted Phases						6
Actuated Green, G (s)	5.7	26.8	17.1		7.4	7.4
Effective Green, g (s)	5.7	26.8	17.1		7.4	7.4
Actuated g/C Ratio	0.14	0.64	0.41		0.18	0.18
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)	239	1183	744		310	278
v/s Ratio Prot	0.08	c0.45	0.27		c0.04	
v/s Ratio Perm						0.01
v/c Ratio	0.56	0.71	0.67		0.23	0.03
Uniform Delay, d1	17.1	5.1	10.3		15.0	14.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.0	1.9	2.4		0.4	0.0
Delay (s)	20.1	7.0	12.6		15.3	14.5
Level of Service	C	A	B		B	B
Approach Delay (s)		8.8	12.6		15.0	
Approach LOS		A	B		B	

Intersection Summary

HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	42.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps













Sutter Point EIR
Existing Plus Project PM With Mitigation



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		0.86	1.00		0.81	0.81				0.97		0.76
Frt		1.00	0.85		0.99	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		6408	1583		5991	1282				3433		3610
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		6408	1583		5991	1282				3433		3610
Volume (vph)	0	1930	1740	0	1930	1020	0	0	0	120	0	450
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1990	1794	0	1990	1052	0	0	0	124	0	464
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	0	0	0	5
Lane Group Flow (vph)	0	1990	1794	0	2086	950	0	0	0	124	0	459
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					8		
Permitted Phases			Free			Free						8
Actuated Green, G (s)		50.3	75.0		50.3	75.0				16.7		16.7
Effective Green, g (s)		50.3	75.0		50.3	75.0				16.7		16.7
Actuated g/C Ratio		0.67	1.00		0.67	1.00				0.22		0.22
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		4298	1583		4018	1282				764		804
v/s Ratio Prot		0.31			0.35					0.04		
v/s Ratio Perm			c1.13			0.74						0.13
v/c Ratio		0.46	1.13		0.52	0.74				0.16		0.57
Uniform Delay, d1		5.9	37.5		6.2	0.0				23.5		26.0
Progression Factor		0.51	1.00		1.00	1.00				1.00		1.00
Incremental Delay, d2		0.2	64.5		0.5	3.9				0.1		1.0
Delay (s)		3.2	102.0		6.7	3.9				23.6		26.9
Level of Service		A	F		A	A				C		C
Approach Delay (s)		50.1			5.8			0.0			26.2	
Approach LOS		D			A			A			C	
Intersection Summary												
HCM Average Control Delay			30.0									HCM Level of Service C
HCM Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			75.0									Sum of lost time (s) 0.0
Intersection Capacity Utilization			50.8%									ICU Level of Service A
Analysis Period (min)			15									
c Critical Lane Group												

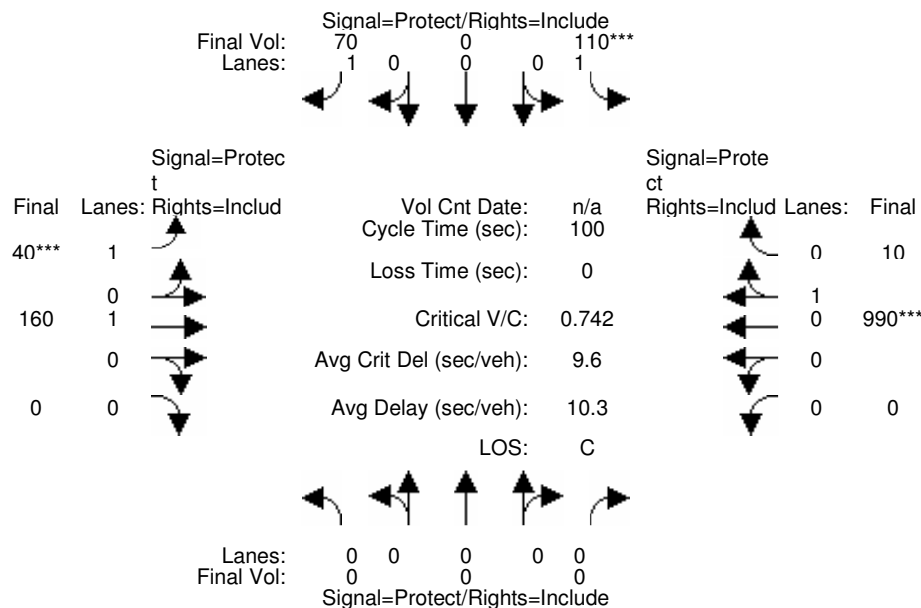
HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Point EIR
Existing Plus Project PM With Mitigation

												
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		0.81	0.81		0.86	1.00	0.94		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		6035	1282		6408	1583	4990		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		6035	1282		6408	1583	4990		1583			
Volume (vph)	0	1640	410	0	2380	300	570	0	1170	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1691	423	0	2454	309	588	0	1206	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1691	423	0	2454	309	588	0	1206	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		50.9	75.0		50.9	75.0	16.1		75.0			
Effective Green, g (s)		50.9	75.0		50.9	75.0	16.1		75.0			
Actuated g/C Ratio		0.68	1.00		0.68	1.00	0.21		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		4096	1282		4349	1583	1071		1583			
v/s Ratio Prot		0.28			0.38		0.12					
v/s Ratio Perm			0.33			0.20			c0.76			
v/c Ratio		0.41	0.33		0.56	0.20	0.55		0.76			
Uniform Delay, d1		5.4	0.0		6.3	0.0	26.2		0.0			
Progression Factor		1.00	1.00		0.89	1.00	1.00		1.00			
Incremental Delay, d2		0.3	0.7		0.3	0.2	0.6		3.5			
Delay (s)		5.7	0.7		5.9	0.2	26.8		3.5			
Level of Service		A	A		A	A	C		A			
Approach Delay (s)		4.7			5.3			11.2			0.0	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM Average Control Delay			6.7				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			75.0				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			52.0%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Project AM

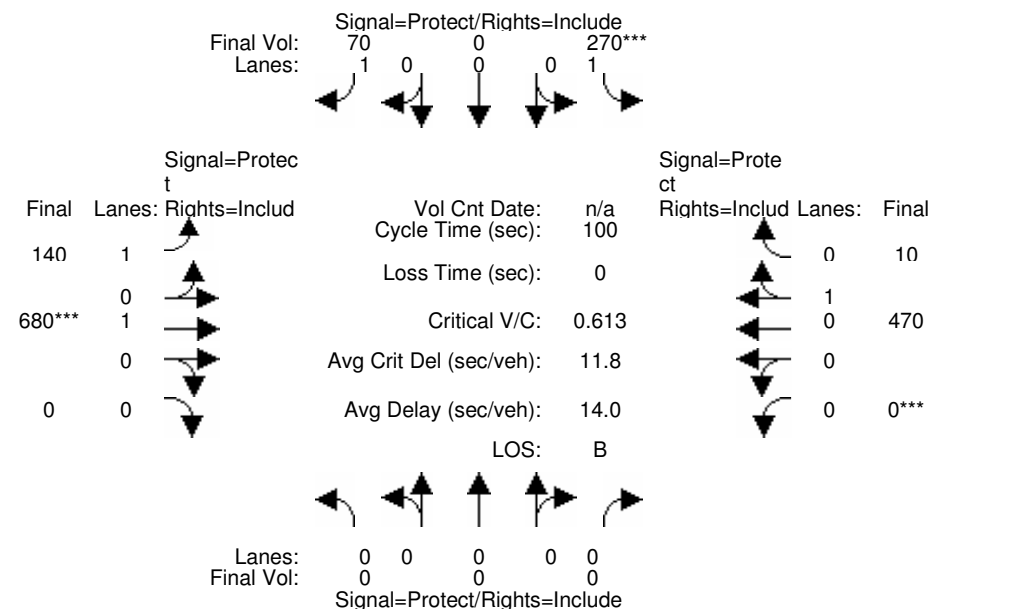
Intersection #117: MIT-Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	110	0	70	40	160	0	0	990	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	110	0	70	40	160	0	0	990	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	110	0	70	40	160	0	0	990	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	110	0	70	40	160	0	0	990	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	110	0	70	40	160	0	0	990	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	110	0	70	40	160	0	0	990	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.99	0.01
Final Sat.:	0	0	0	1550	0	1550	1550	1550	0	0	1535	16
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.07	0.00	0.05	0.03	0.10	0.00	0.00	0.65	0.65
Crit Volume:	0			110			40			1000		
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Project PM

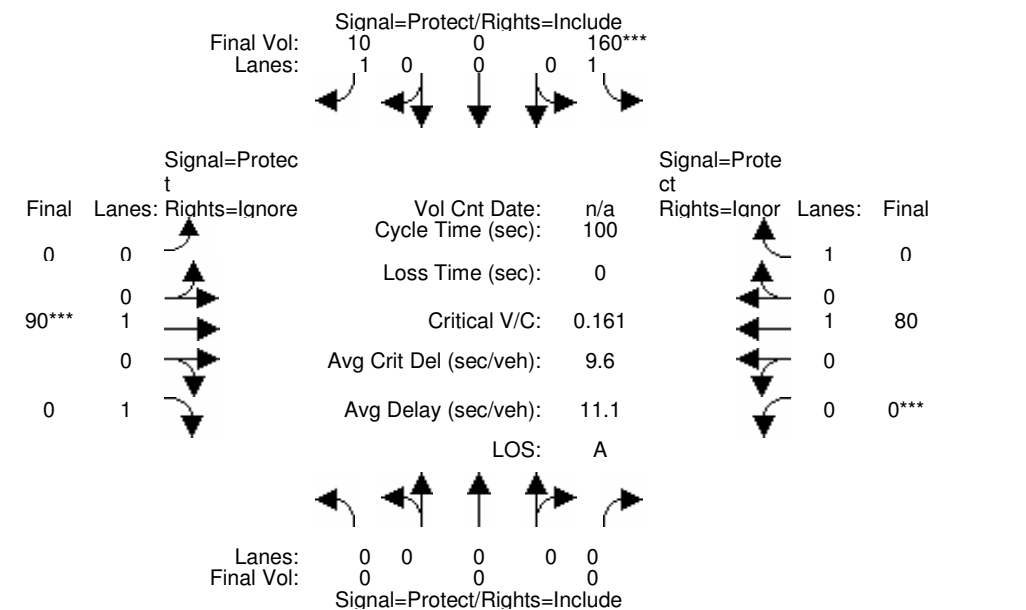
Intersection #117: MIT-Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	270	0	70	140	680	0	0	470	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	270	0	70	140	680	0	0	470	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	270	0	70	140	680	0	0	470	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	270	0	70	140	680	0	0	470	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	270	0	70	140	680	0	0	470	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	270	0	70	140	680	0	0	470	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.98	0.02
Final Sat.:	0	0	0	1550	0	1550	1550	1550	0	0	1518	32
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.17	0.00	0.05	0.09	0.44	0.00	0.00	0.31	0.31
Crit Volume:	0			270			680			0		
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Project AM

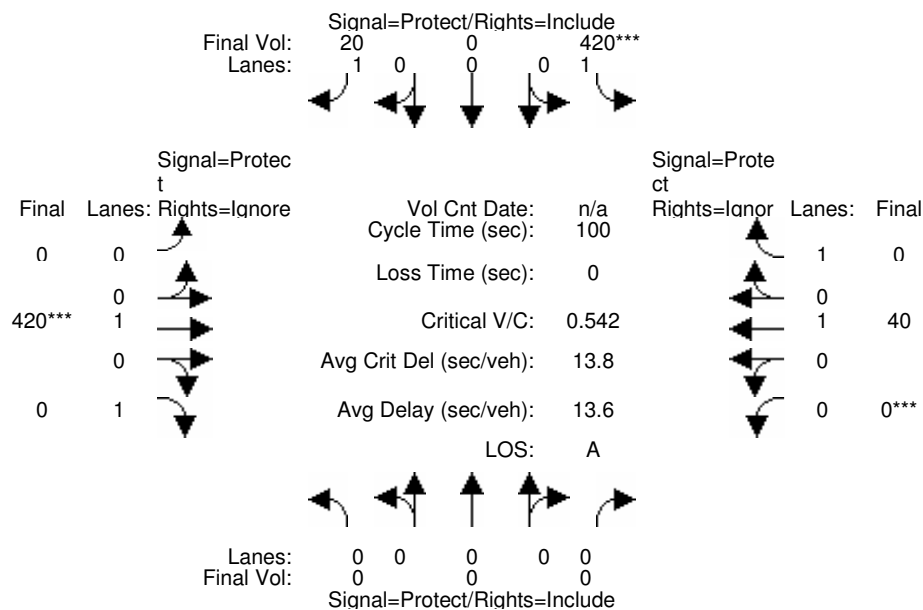
Intersection #121: MIT-Elkhorn Boulevard / SR 70 / SR 99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	160	0	10	0	90	10	0	80	870
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	160	0	10	0	90	10	0	80	870
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	160	0	10	0	90	10	0	80	870
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	160	0	10	0	90	0	0	80	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	160	0	10	0	90	0	0	80	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
FinalVolume:	0	0	0	160	0	10	0	90	0	0	80	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	1550	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.10	0.00	0.01	0.00	0.06	0.00	0.00	0.05	0.00
Crit Volume:		0		160				90			0	
Crit Moves:				***				***			***	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Project PM

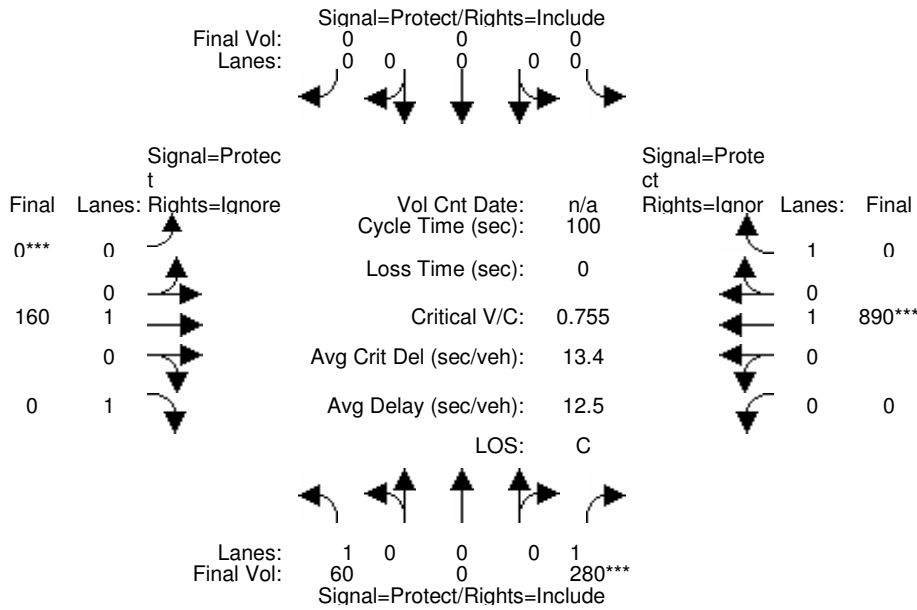
Intersection #121: MIT-Elkhorn Boulevard / SR 70 / SR 99 SB Ramps



Street Name:	SR 70 / SR 99 SB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	420	0	20	0	420	130	0	40	360
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	420	0	20	0	420	130	0	40	360
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	420	0	20	0	420	130	0	40	360
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	0	0	0	420	0	20	0	420	0	0	40	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	420	0	20	0	420	0	0	40	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	0	0	0	420	0	20	0	420	0	0	40	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Final Sat.:	0	0	0	1550	0	1550	0	1550	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.27	0.00	0.01	0.00	0.27	0.00	0.00	0.03	0.00
Crit Volume:	0			420			420			0		
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Project AM

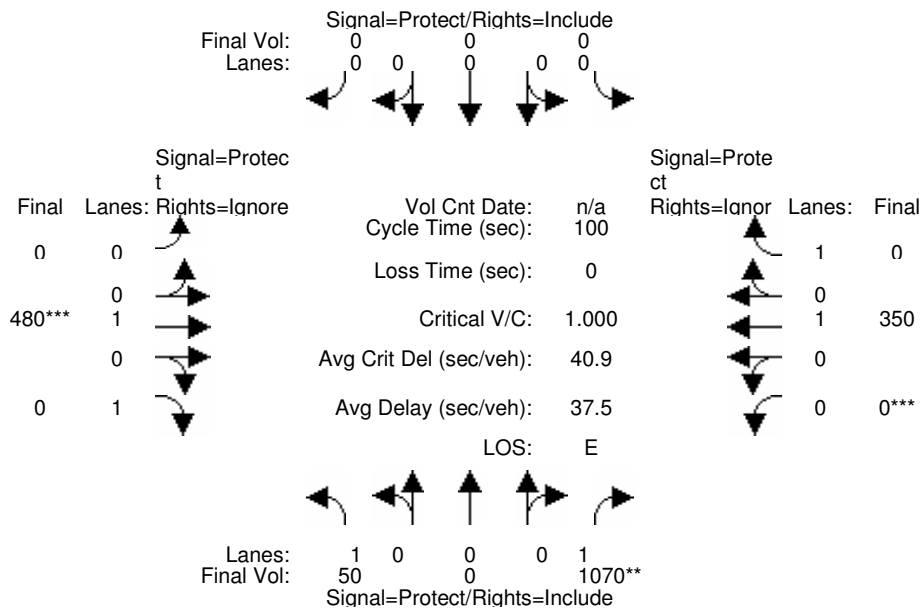
Intersection #122: MIT-Elkhorn Boulevard / SR70 / SR 99 NB Ramps



Street Name:	SR70 / SR 99 NB Ramps						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	60	0	280	0	0	0	0	160	90	0	890	330
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	60	0	280	0	0	0	0	160	90	0	890	330
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	60	0	280	0	0	0	0	160	90	0	890	330
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	60	0	280	0	0	0	0	160	0	0	890	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	60	0	280	0	0	0	0	160	0	0	890	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	60	0	280	0	0	0	0	160	0	0	890	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.04	0.00	0.18	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.57	0.00
Crit Volume:			280	0					0		890	
Crit Moves:			***						****		***	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Project PM

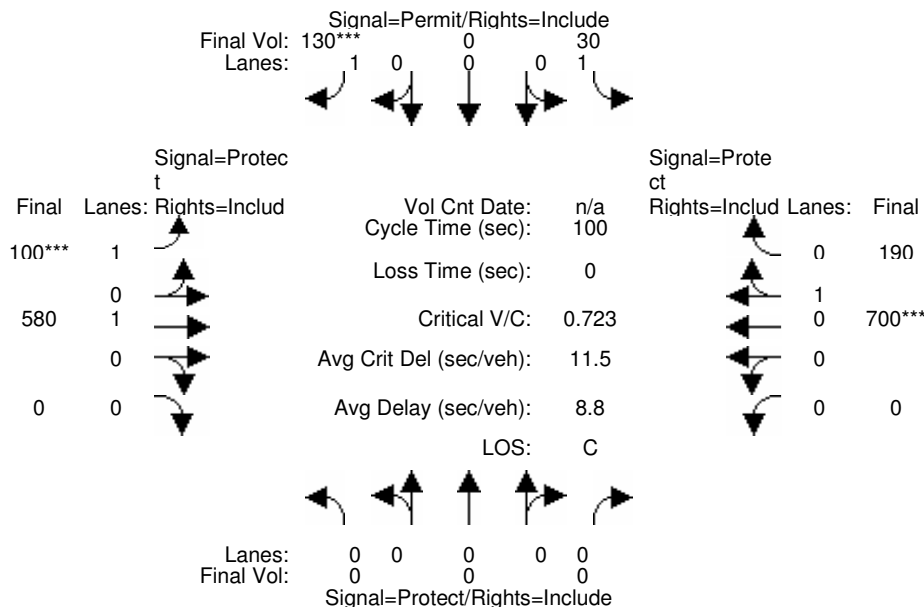
Intersection #122: MIT-Elkhorn Boulevard / SR70 / SR 99 NB Ramps



Street Name:	SR70 / SR 99 NB Ramps						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	50	0	1070	0	0	0	0	480	360	0	350	240
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	50	0	1070	0	0	0	0	480	360	0	350	240
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	50	0	1070	0	0	0	0	480	360	0	350	240
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
PHF Volume:	50	0	1070	0	0	0	0	480	0	0	350	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	50	0	1070	0	0	0	0	480	0	0	350	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Volume:	50	0	1070	0	0	0	0	480	0	0	350	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00
Final Sat.:	1550	0	1550	0	0	0	0	1550	1550	0	1550	1550
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.69	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.23	0.00
Crit Volume:			1070	0				480		0		
Crit Moves:			***					****		***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Existing Plus Project AM

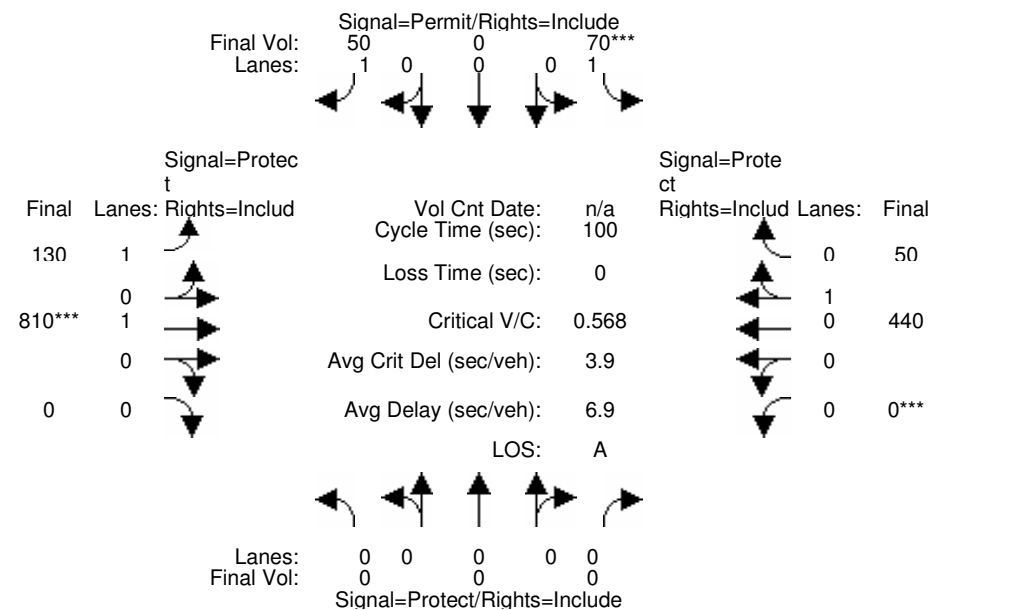
Intersection #124: MIT-Elkhorn Boulevard / East Levee Boulevard



Street Name:	East Levee Boulevard						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	30	0	130	100	580	0	0	700	190
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	30	0	130	100	580	0	0	700	190
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	30	0	130	100	580	0	0	700	190
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	30	0	130	100	580	0	0	700	190
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	30	0	130	100	580	0	0	700	190
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	30	0	130	100	580	0	0	700	190
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.79	0.21
Final Sat.:	0	0	0	1550	0	1550	1550	1550	0	0	1219	331
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.02	0.00	0.08	0.06	0.37	0.00	0.00	0.57	0.57
Crit Volume:	0					130	100				890	
Crit Moves:						****	****				****	

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Existing Plus Project PM

Intersection #124: MIT-Elkhorn Boulevard / East Levee Boulevard



Street Name:	East Levee Boulevard						Elkhorn Boulevard					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	70	0	50	130	810	0	0	440	50
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	70	0	50	130	810	0	0	440	50
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	70	0	50	130	810	0	0	440	50
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	70	0	50	130	810	0	0	440	50
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	70	0	50	130	810	0	0	440	50
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	70	0	50	130	810	0	0	440	50
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.90	0.10
Final Sat.:	0	0	0	1550	0	1550	1550	1550	0	0	1392	158
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.05	0.00	0.03	0.08	0.52	0.00	0.00	0.32	0.32
Crit Volume:	0			70			810			0		
Crit Moves:				***			***			***		

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3610 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 2000 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3610	2000	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	981	543	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.889 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 4414 2228 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4414$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4414	4700	No
Fi F			
$v = v - v$	2186	4700	No
FO F R			
v	2228	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4414	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 24.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.499$
S
Space mean speed in ramp influence area, $S = 53.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 53.5$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1610 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 10 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1610	10	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	437	3	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1969	11	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1969 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	1980	4700	No
FO			
v	1980	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.2 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.308
S
Space mean speed in ramp influence area, S = 57.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.9 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego DIAG ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1620 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 40 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1620	40	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	440	11	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1981	45	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1981 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2026	4700	No
FO			
v	2026	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.6 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.309
S
Space mean speed in ramp influence area, S = 57.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.9 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2710 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1170 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2710	1170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	736	318	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3063	1304	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3063$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3063	4700	No
Fi F			
$v = v - v$	1759	4700	No
FO F R			
v	1304	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3063	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 12.6$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.415$
S
Space mean speed in ramp influence area, $S = 55.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.4$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Loop On
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1540 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 880 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1540	880	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	418	239	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1741	980	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1741$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2721	4700	No
FO			
v	2721	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.339
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.2 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego DiagOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2420 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 700 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2420	700	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	658	190	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2736	780	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2736 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	3516	4700	No
FO			
v	3516	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.8 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.411
S
Space mean speed in ramp influence area, S = 55.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.5 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3680 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1740 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3680	1740	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	948	448	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3946	1839	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3946$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3946	4700	No
Fi F			
$v = v - v$	2107	4700	No
FO F R			
v	1839	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3946	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 20.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.464$
S
Space mean speed in ramp influence area, $S = 54.3$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.3$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1940 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 410 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1940	410	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	500	106	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2080	433	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2080$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2513	4700	No
FO			
v	2513	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.328
S
Space mean speed in ramp influence area, S = 57.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.5 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego DIAG ON
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2350 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 300 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2350	300	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	606	77	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2520	317	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2520$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2837	4700	No
FO			
v	2837	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.346
S
Space mean speed in ramp influence area, S = 57.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.0 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1810 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1810	570	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	466	147	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 1978 602 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1978$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1978	4700	No
Fi F			
$v = v - v$	1376	4700	No
FO F R			
v	602	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1978	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 3.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, $D = 0.352$
S
Space mean speed in ramp influence area, $S = 56.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego LoopOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1240 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 1020 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	1240	1020	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	320	263	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1355	1078	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1355 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2433	4700	No
FO			
v	2433	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.3 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.324
S
Space mean speed in ramp influence area, S = 57.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.5 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/14/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego DiagOn
Jurisdiction: Sutter County
Analysis Year: Existing PP NPP
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2260 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 1740 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	2260	1740	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	582	448	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2470	1839	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2470$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4309	4700	No
FO			
v	4309	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.570
S
Space mean speed in ramp influence area, S = 51.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.9 mph

**CUMULATIVE CONDITIONS
PLUS PHASE 1 PROJECT
WITH MITIGATION MEASURES**

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP AM

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	
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	4150	1583	1770	4803	1583	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	4150	1583	1770	4803	1583	
Volume (vph)	10	10	10	90	10	30	10	1330	30	110	2990	10	
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)	11	11	11	98	11	33	11	1446	33	120	3250	11	
RTOR Reduction (vph)	0	11	0	0	0	30	0	0	11	0	0	2	
Lane Group Flow (vph)	11	11	0	98	11	3	11	1446	22	120	3250	9	
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%	
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases						8			2			6	
Actuated Green, G (s)	1.5	5.0		9.0	12.5	12.5	1.5	88.3	88.3	13.3	100.1	100.1	
Effective Green, g (s)	1.5	5.0		9.0	12.5	12.5	1.5	88.3	88.3	13.3	100.1	100.1	
Actuated g/C Ratio	0.01	0.04		0.07	0.09	0.09	0.01	0.67	0.67	0.10	0.76	0.76	
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)	20	65		235	177	150	20	2785	1062	179	3653	1204	
v/s Ratio Prot	0.01	c0.01		c0.03	0.01		0.01	0.35		c0.07	c0.68		
v/s Ratio Perm						0.00			0.01			0.01	
v/c Ratio	0.55	0.18		0.42	0.06	0.02	0.55	0.52	0.02	0.67	0.89	0.01	
Uniform Delay, d1	64.7	61.3		58.8	54.2	54.0	64.7	10.9	7.2	57.0	11.7	3.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	28.9	1.3		1.2	0.1	0.1	28.9	0.2	0.0	9.5	3.0	0.0	
Delay (s)	93.6	62.6		60.0	54.4	54.1	93.6	11.1	7.2	66.5	14.7	3.8	
Level of Service	F	E		E	D	D	F	B	A	E	B	A	
Approach Delay (s)		72.9			58.2			11.6			16.5		
Approach LOS		E			E			B			B		
Intersection Summary													
HCM Average Control Delay			16.6		HCM Level of Service						B		
HCM Volume to Capacity ratio			0.83										
Actuated Cycle Length (s)			131.6		Sum of lost time (s)						16.0		
Intersection Capacity Utilization			80.3%		ICU Level of Service						D		
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP AM



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	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)	50	870	1180	80	150	90
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	946	1283	87	163	98
RTOR Reduction (vph)	0	0	0	43	0	77
Lane Group Flow (vph)	54	946	1283	44	163	21
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	1.9	31.0	25.1	25.1	10.6	10.6
Effective Green, g (s)	1.9	31.0	25.1	25.1	10.6	10.6
Actuated g/C Ratio	0.04	0.62	0.51	0.51	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)	68	2212	1791	801	378	338
v/s Ratio Prot	c0.03	0.27	c0.36		c0.09	
v/s Ratio Perm				0.03		0.01
v/c Ratio	0.79	0.43	0.72	0.05	0.43	0.06
Uniform Delay, d1	23.7	4.8	9.5	6.2	16.9	15.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.6	0.1	1.4	0.0	0.8	0.1
Delay (s)	69.2	4.9	10.9	6.3	17.7	15.6
Level of Service	E	A	B	A	B	B
Approach Delay (s)		8.4	10.6		16.9	
Approach LOS		A	B		B	

Intersection Summary

HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP AM



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	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Volume (vph)	880	140	60	1170	90	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	957	152	65	1272	98	22
RTOR Reduction (vph)	0	108	0	0	0	19
Lane Group Flow (vph)	957	44	65	1272	98	3
Turn Type		Perm	Prot		Perm	
Protected Phases	2		1		4	
Permitted Phases		2		6		4
Actuated Green, G (s)	27.0	27.0	4.0	35.1	11.0	11.0
Effective Green, g (s)	27.0	27.0	4.0	35.1	11.0	11.0
Actuated g/C Ratio	0.29	0.29	0.04	0.38	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)	1026	459	76	1334	209	187
v/s Ratio Prot	c0.27		c0.04		c0.06	
v/s Ratio Perm		0.03		c0.36		0.00
v/c Ratio	0.93	0.10	0.86	0.95	0.47	0.01
Uniform Delay, d1	32.2	24.1	44.3	28.2	38.3	36.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.6	0.1	56.8	14.9	1.7	0.0
Delay (s)	46.7	24.2	101.1	43.1	40.0	36.3
Level of Service	D	C	F	D	D	D
Approach Delay (s)	43.7			45.9	39.3	
Approach LOS	D			D	D	

Intersection Summary

HCM Average Control Delay	44.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	93.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP AM

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	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1631		1770	1723	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1631		1770	1723	
Volume (vph)	10	850	40	90	1150	40	70	10	50	50	10	10
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)	11	924	43	98	1250	43	76	11	54	54	11	11
RTOR Reduction (vph)	0	0	26	0	0	23	0	44	0	0	9	0
Lane Group Flow (vph)	11	924	17	98	1250	20	76	21	0	54	13	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						
Actuated Green, G (s)	0.6	22.3	22.3	4.4	26.1	26.1	2.9	10.0		2.1	9.2	
Effective Green, g (s)	0.6	22.3	22.3	4.4	26.1	26.1	2.9	10.0		2.1	9.2	
Actuated g/C Ratio	0.01	0.41	0.41	0.08	0.48	0.48	0.05	0.18		0.04	0.17	
Clearance Time (s)	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	
Lane Grp Cap (vph)	19	1440	644	142	1686	754	94	298		68	289	
v/s Ratio Prot	0.01	0.26		c0.06	c0.35		c0.04	c0.01		0.03	0.01	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.58	0.64	0.03	0.69	0.74	0.03	0.81	0.07		0.79	0.04	
Uniform Delay, d1	27.0	13.0	9.7	24.5	11.6	7.6	25.7	18.5		26.1	19.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.3	1.0	0.0	13.5	1.8	0.0	38.1	0.1		45.6	0.1	
Delay (s)	63.3	14.0	9.8	38.0	13.4	7.6	63.8	18.6		71.7	19.2	
Level of Service	E	B	A	D	B	A	E	B		E	B	
Approach Delay (s)		14.4			15.0			43.0			56.5	
Approach LOS		B			B			D			E	
Intersection Summary												
HCM Average Control Delay			17.5				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			54.8				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			55.7%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												



































HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP AM

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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	810	1260	110	680	1470	20	110	990	590	30	900	910
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)	880	1370	120	739	1598	22	120	1076	641	33	978	989
RTOR Reduction (vph)	0	0	48	0	0	12	0	0	374	0	0	0
Lane Group Flow (vph)	880	1370	72	739	1598	10	120	1076	267	33	978	989
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases			2			6			4			8
Actuated Green, G (s)	36.1	43.2	43.2	28.1	34.8	34.8	4.0	30.7	30.7	2.3	29.0	65.1
Effective Green, g (s)	36.1	45.2	45.2	27.7	36.8	36.8	4.0	31.0	31.0	2.3	29.3	65.4
Actuated g/C Ratio	0.30	0.37	0.37	0.23	0.30	0.30	0.03	0.25	0.25	0.02	0.24	0.54
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.0
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	3.0
Lane Grp Cap (vph)	1014	1881	586	778	1531	477	112	1290	402	65	1219	899
v/s Ratio Prot	0.26	0.27		0.22	c0.31		c0.03	0.21		0.01	0.19	c0.32
v/s Ratio Perm			0.05			0.01			0.17			0.30
v/c Ratio	0.87	0.73	0.12	0.95	1.04	0.02	1.07	0.83	0.66	0.51	0.80	1.10
Uniform Delay, d1	40.8	33.2	25.4	46.6	42.7	30.0	59.1	43.2	40.9	59.4	43.7	28.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.0	1.2	0.0	20.5	35.3	0.0	105.6	4.6	3.2	6.1	3.7	61.0
Delay (s)	48.8	34.4	25.5	67.1	78.0	30.0	164.7	47.8	44.1	65.5	47.4	89.4
Level of Service	D	C	C	E	E	C	F	D	D	E	D	F
Approach Delay (s)		39.3			74.1			54.1			68.5	
Approach LOS		D			E			D			E	
Intersection Summary												
HCM Average Control Delay			58.9			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			122.2			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			98.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	320	960	40	270	1010	400	10	1200	280	360	840	640
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)	348	1043	43	293	1098	435	11	1304	304	391	913	696
RTOR Reduction (vph)	0	0	31	0	0	6	0	0	148	0	0	25
Lane Group Flow (vph)	348	1043	12	293	1098	429	11	1304	156	391	913	671
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	13.0	30.3	30.3	11.7	29.0	42.0	0.6	43.2	43.2	13.0	55.6	68.6
Effective Green, g (s)	13.0	32.3	32.3	11.7	31.0	44.0	0.6	45.2	45.2	13.0	57.6	70.6
Actuated g/C Ratio	0.11	0.27	0.27	0.10	0.26	0.37	0.01	0.38	0.38	0.11	0.49	0.60
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	2.0	2.0	4.8	4.8	2.0	4.8	3.0
Lane Grp Cap (vph)	378	1390	433	340	1334	643	17	1353	605	378	1725	999
v/s Ratio Prot	c0.10	0.21		0.09	c0.22	c0.07	0.00	c0.37		c0.11	0.26	0.07
v/s Ratio Perm			0.01			0.20			0.10			0.35
v/c Ratio	0.92	0.75	0.03	0.86	0.82	0.67	0.65	0.96	0.26	1.03	0.53	0.67
Uniform Delay, d1	52.1	39.3	31.4	52.5	41.0	31.0	58.7	35.7	25.0	52.6	20.9	16.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.3	2.7	0.0	18.9	4.7	2.0	49.2	16.7	0.4	55.5	0.5	1.8
Delay (s)	79.4	42.0	31.5	71.4	45.7	33.0	107.9	52.4	25.4	108.1	21.5	17.8
Level of Service	E	D	C	E	D	C	F	D	C	F	C	B
Approach Delay (s)		50.7			46.8			47.7			37.1	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	45.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	118.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP AM



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			0.95	0.95			1.00			1.00
Frt		1.00			1.00	0.85			0.86			0.86
Flt Protected		1.00			1.00	1.00			1.00			1.00
Satd. Flow (prot)		1856			1770	1504			1611			1611
Flt Permitted		1.00			1.00	1.00			1.00			1.00
Satd. Flow (perm)		1856			1770	1504			1611			1611
Volume (vph)	0	370	10	0	970	330	0	0	150	0	0	70
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	402	11	0	1054	359	0	0	163	0	0	76
RTOR Reduction (vph)	0	1	0	0	0	81	0	0	145	0	0	68
Lane Group Flow (vph)	0	412	0	0	1054	278	0	0	18	0	0	8
Turn Type						Perm			custom			custom
Protected Phases		2			6				4			4
Permitted Phases						6						
Actuated Green, G (s)		51.8			51.8	51.8			7.2			7.2
Effective Green, g (s)		51.8			51.8	51.8			7.2			7.2
Actuated g/C Ratio		0.77			0.77	0.77			0.11			0.11
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)		1435			1368	1163			173			173
v/s Ratio Prot		0.22			c0.60				c0.01			0.01
v/s Ratio Perm						0.18						
v/c Ratio		0.29			0.77	0.24			0.10			0.05
Uniform Delay, d1		2.2			4.3	2.1			27.0			26.8
Progression Factor		1.00			1.00	1.00			1.00			1.00
Incremental Delay, d2		0.1			2.7	0.1			0.3			0.1
Delay (s)		2.3			7.0	2.2			27.2			26.9
Level of Service		A			A	A			C			C
Approach Delay (s)		2.3			5.8			27.2			26.9	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM Average Control Delay			7.6				HCM Level of Service		A			
HCM Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			67.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			68.7%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP AM



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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	770	310	470	410	780	420	640	1140	100	210	1360	800
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)	837	337	511	446	848	457	696	1239	109	228	1478	870
RTOR Reduction (vph)	0	0	193	0	0	153	0	0	64	0	0	3
Lane Group Flow (vph)	837	337	318	446	848	304	696	1239	45	228	1478	867
Turn Type	Prot		Perm		Prot		Perm		Prot		Perm	
Protected Phases	3	8		7	4		1	6		5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	29.5	40.2	40.2	20.0	31.0	31.0	24.5	50.1	50.1	12.3	37.9	67.4
Effective Green, g (s)	31.0	41.9	41.9	21.5	32.4	32.4	26.0	51.8	51.8	13.8	39.6	70.6
Actuated g/C Ratio	0.21	0.29	0.29	0.15	0.22	0.22	0.18	0.36	0.36	0.10	0.27	0.49
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.5
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	1.0
Lane Grp Cap (vph)	734	1469	457	509	1136	354	616	1817	566	327	1389	814
v/s Ratio Prot	c0.24	0.07		0.13	0.17		c0.20	0.24		0.07	0.29	c0.23
v/s Ratio Perm			0.20			c0.19			0.03			0.32
v/c Ratio	1.14	0.23	0.69	0.88	0.75	0.86	1.13	0.68	0.08	0.70	1.06	1.07
Uniform Delay, d1	57.0	39.3	45.9	60.4	52.5	54.1	59.5	39.6	30.8	63.6	52.7	37.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	79.1	0.2	6.6	15.1	3.3	19.8	77.6	1.5	0.1	5.2	43.2	50.5
Delay (s)	136.1	39.5	52.5	75.5	55.7	73.9	137.1	41.1	31.0	68.7	95.9	87.7
Level of Service	F	D	D	E	E	E	F	D	C	E	F	F
Approach Delay (s)		91.4			65.5			73.2			90.7	
Approach LOS		F			E			E			F	

Intersection Summary

HCM Average Control Delay	81.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP AM















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
Lane Util. Factor		0.95	1.00		0.86	0.86				1.00		1.00
Frt		1.00	0.85		0.95	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		3539	1583		4589	1362				1770		1583
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		3539	1583		4589	1362				1770		1583
Volume (vph)	0	290	420	0	1600	1720	0	0	0	80	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	315	457	0	1739	1870	0	0	0	87	0	261
RTOR Reduction (vph)	0	0	0	0	60	0	0	0	0	0	0	18
Lane Group Flow (vph)	0	315	457	0	2426	1123	0	0	0	87	0	243
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		67.6	95.0		67.6	95.0				19.4		19.4
Effective Green, g (s)		67.6	95.0		67.6	95.0				19.4		19.4
Actuated g/C Ratio		0.71	1.00		0.71	1.00				0.20		0.20
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		2518	1583		3265	1362				361		323
v/s Ratio Prot		0.09			0.53					0.05		
v/s Ratio Perm			0.29			0.82						0.15
v/c Ratio		0.13	0.29		0.74	0.82				0.24		0.75
Uniform Delay, d1		4.3	0.0		8.4	0.0				31.6		35.5
Progression Factor		0.28	1.00		1.81	1.00				1.00		1.00
Incremental Delay, d2		0.1	0.4		0.7	2.6				0.3		9.5
Delay (s)		1.3	0.4		15.9	2.6				32.0		45.0
Level of Service		A	A		B	A				C		D
Approach Delay (s)		0.7			11.8			0.0			41.8	
Approach LOS		A			B			A			D	

Intersection Summary

HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP AM

												
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			
Lane Util. Factor		0.95	1.00		0.91	1.00	0.95	0.86	0.91			
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (prot)		3539	1583		5085	1583	1681	1522	2882			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.95	1.00			
Satd. Flow (perm)		3539	1583		5085	1583	1681	1522	2882			
Volume (vph)	0	320	50	0	2620	50	700	0	800	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)	0	348	54	0	2848	54	761	0	870	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	604	0	0	0
Lane Group Flow (vph)	0	348	54	0	2848	54	390	371	266	0	0	0
Turn Type		Free			Free		Prot	custom				
Protected Phases		2			6		4	8				
Permitted Phases		Free			Free			4				
Actuated Green, G (s)		58.0	95.0		58.0	95.0	29.0	29.0	29.0			
Effective Green, g (s)		58.0	95.0		58.0	95.0	29.0	29.0	29.0			
Actuated g/C Ratio		0.61	1.00		0.61	1.00	0.31	0.31	0.31			
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)		2161	1583		3105	1583	513	465	880			
v/s Ratio Prot		0.10			c0.56		0.23	c0.24				
v/s Ratio Perm		0.03			0.03			0.09				
v/c Ratio		0.16	0.03		0.92	0.03	0.76	0.80	0.30			
Uniform Delay, d1		8.0	0.0		16.4	0.0	29.9	30.3	25.3			
Progression Factor		0.60	1.00		0.76	1.00	1.00	1.00	1.00			
Incremental Delay, d2		0.2	0.0		3.4	0.0	6.5	9.2	0.2			
Delay (s)		4.9	0.0		15.8	0.0	36.4	39.5	25.4			
Level of Service		A	A		B	A	D	D	C			
Approach Delay (s)		4.3			15.5			31.3			0.0	
Approach LOS		A			B			C			A	
Intersection Summary												
HCM Average Control Delay		19.8			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		95.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		81.6%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP PM

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
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		3433	1863	1583	1770	4150	1583	1770	4803	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		3433	1863	1583	1770	4150	1583	1770	4803	1583
Volume (vph)	10	10	10	30	10	70	10	2790	60	40	1550	10
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)	11	11	11	33	11	76	11	3033	65	43	1685	11
RTOR Reduction (vph)	0	10	0	0	0	71	0	0	10	0	0	2
Lane Group Flow (vph)	11	12	0	33	11	5	11	3033	55	43	1685	9
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	2.8	6.5		4.3	8.0	8.0	1.5	103.0	103.0	4.0	105.5	105.5
Effective Green, g (s)	2.8	6.5		4.3	8.0	8.0	1.5	103.0	103.0	4.0	105.5	105.5
Actuated g/C Ratio	0.02	0.05		0.03	0.06	0.06	0.01	0.77	0.77	0.03	0.79	0.79
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)	37	84		110	111	95	20	3195	1219	53	3787	1248
v/s Ratio Prot	0.01	c0.01		c0.01	0.01		0.01	c0.73		c0.02	0.35	
v/s Ratio Perm						0.00			0.03			0.01
v/c Ratio	0.30	0.14		0.30	0.10	0.05	0.55	0.95	0.04	0.81	0.44	0.01
Uniform Delay, d1	64.5	61.0		63.3	59.5	59.3	65.8	13.2	3.7	64.5	4.6	3.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.7		1.5	0.4	0.2	28.9	7.2	0.0	59.7	0.1	0.0
Delay (s)	69.0	61.7		64.8	59.9	59.5	94.7	20.4	3.7	124.2	4.7	3.0
Level of Service	E	E		E	E	E	F	C	A	F	A	A
Approach Delay (s)		64.1			61.0			20.3			7.6	
Approach LOS		E			E			C			A	

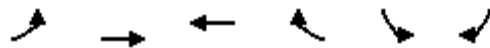
Intersection Summary

HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	133.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Riego Rd & Pleasant Grove (N)

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP PM



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	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)	80	1280	960	120	50	60
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	1391	1043	130	54	65
RTOR Reduction (vph)	0	0	0	67	0	53
Lane Group Flow (vph)	87	1391	1043	63	54	12
Turn Type	Prot		Perm		Perm	
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	3.5	29.8	22.3	22.3	8.5	8.5
Effective Green, g (s)	3.5	29.8	22.3	22.3	8.5	8.5
Actuated g/C Ratio	0.08	0.64	0.48	0.48	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)	134	2278	1705	762	325	291
v/s Ratio Prot	0.05	c0.39	0.29		c0.03	
v/s Ratio Perm				0.04		0.01
v/c Ratio	0.65	0.61	0.61	0.08	0.17	0.04
Uniform Delay, d1	20.8	4.8	8.8	6.5	15.9	15.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.4	0.5	0.7	0.0	0.2	0.1
Delay (s)	31.2	5.3	9.5	6.5	16.2	15.6
Level of Service	C	A	A	A	B	B
Approach Delay (s)		6.9	9.1		15.9	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	46.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: Riego Rd & Pleasant Grove (S)

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP PM



























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	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Volume (vph)	1140	190	40	960	120	60
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1239	207	43	1043	130	65
RTOR Reduction (vph)	0	120	0	0	0	57
Lane Group Flow (vph)	1239	87	43	1043	130	8
Turn Type		Perm	Prot		Perm	
Protected Phases	2		1		4	
Permitted Phases		2		6		4
Actuated Green, G (s)	34.2	34.2	2.3	28.2	12.0	12.0
Effective Green, g (s)	34.2	34.2	2.3	28.2	12.0	12.0
Actuated g/C Ratio	0.37	0.37	0.02	0.30	0.13	0.13
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)	1306	584	44	1077	229	205
v/s Ratio Prot	c0.35		c0.02		c0.07	
v/s Ratio Perm		0.06		c0.29		0.01
v/c Ratio	0.95	0.15	0.98	0.97	0.57	0.04
Uniform Delay, d1	28.4	19.5	45.2	31.8	37.9	35.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.2	0.1	125.9	20.0	3.2	0.1
Delay (s)	42.6	19.7	171.0	51.8	41.1	35.4
Level of Service	D	B	F	D	D	D
Approach Delay (s)	39.4			56.5	39.2	
Approach LOS	D			E	D	

Intersection Summary

HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			
































HCM Signalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP PM

												
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	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1597		1770	1723	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1597		1770	1723	
Volume (vph)	10	1090	100	40	920	50	70	10	190	70	10	10
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)	11	1185	109	43	1000	54	76	11	207	76	11	11
RTOR Reduction (vph)	0	0	61	0	0	30	0	146	0	0	9	0
Lane Group Flow (vph)	11	1185	48	43	1000	24	76	72	0	76	13	0
Turn Type	Prot		Perm		Prot		Perm		Prot		Prot	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6						
Actuated Green, G (s)	0.6	21.7	21.7	1.2	22.3	22.3	2.0	8.7		2.0	8.7	
Effective Green, g (s)	0.6	21.7	21.7	1.2	22.3	22.3	2.0	8.7		2.0	8.7	
Actuated g/C Ratio	0.01	0.44	0.44	0.02	0.45	0.45	0.04	0.18		0.04	0.18	
Clearance Time (s)	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	
Lane Grp Cap (vph)	21	1548	693	43	1591	712	71	280		71	302	
v/s Ratio Prot	0.01	c0.33		c0.02	0.28		c0.04	c0.05		0.04	0.01	
v/s Ratio Perm			0.03			0.02						
v/c Ratio	0.52	0.77	0.07	1.00	0.63	0.03	1.07	0.26		1.07	0.04	
Uniform Delay, d1	24.4	11.8	8.1	24.2	10.5	7.6	23.8	17.7		23.8	17.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.6	2.3	0.0	137.2	0.8	0.0	127.5	0.5		127.5	0.1	
Delay (s)	45.9	14.1	8.1	161.4	11.3	7.6	151.3	18.1		151.3	17.0	
Level of Service	D	B	A	F	B	A	F	B		F	B	
Approach Delay (s)		13.9			17.0			52.6			121.1	
Approach LOS		B			B			D			F	
Intersection Summary												
HCM Average Control Delay			22.9		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			49.6		Sum of lost time (s)				16.0			
Intersection Capacity Utilization			59.4%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	1080	1600	140	690	1380	20	150	950	690	20	1040	950
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)	1174	1739	152	750	1500	22	163	1033	750	22	1130	1033
RTOR Reduction (vph)	0	0	44	0	0	12	0	0	327	0	0	0
Lane Group Flow (vph)	1174	1739	108	750	1500	10	163	1033	423	22	1130	1033
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases			2			6			4			8
Actuated Green, G (s)	43.0	48.7	48.7	30.4	35.7	35.7	6.0	36.4	36.4	2.4	32.8	75.8
Effective Green, g (s)	43.0	50.7	50.7	30.0	37.7	37.7	6.0	36.7	36.7	2.4	33.1	76.1
Actuated g/C Ratio	0.32	0.37	0.37	0.22	0.28	0.28	0.04	0.27	0.27	0.02	0.24	0.56
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.0
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	3.0
Lane Grp Cap (vph)	1087	1898	591	758	1412	439	152	1374	428	61	1239	934
v/s Ratio Prot	0.34	0.34		0.22	c0.29		c0.05	0.20		0.01	0.22	c0.35
v/s Ratio Perm			0.07			0.01			c0.27			0.30
v/c Ratio	1.08	0.92	0.18	0.99	1.06	0.02	1.07	0.75	0.99	0.36	0.91	1.11
Uniform Delay, d1	46.4	40.5	28.6	52.7	49.1	35.7	64.9	45.4	49.3	65.9	49.9	29.9
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	51.6	7.3	0.1	29.6	42.4	0.0	93.6	2.1	40.0	3.6	10.1	62.8
Delay (s)	98.0	47.8	28.7	82.4	91.5	35.7	158.5	47.5	89.3	69.6	60.0	92.6
Level of Service	F	D	C	F	F	D	F	D	F	E	E	F
Approach Delay (s)		66.1			87.9			72.9			75.5	
Approach LOS		E			F			E			E	
Intersection Summary												
HCM Average Control Delay			74.9			HCM Level of Service		E				
HCM Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			135.8			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			99.8%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP PM

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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	610	1260	70	250	1020	510	30	1050	280	440	1220	460
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)	663	1370	76	272	1109	554	33	1141	304	478	1326	500
RTOR Reduction (vph)	0	0	46	0	0	4	0	0	151	0	0	7
Lane Group Flow (vph)	663	1370	30	272	1109	550	33	1141	153	478	1326	493
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	22.0	39.3	39.3	11.7	29.0	45.0	1.8	39.6	39.6	16.0	53.8	75.8
Effective Green, g (s)	22.0	41.3	41.3	11.7	31.0	47.0	1.8	41.6	41.6	16.0	55.8	77.8
Actuated g/C Ratio	0.17	0.33	0.33	0.09	0.24	0.37	0.01	0.33	0.33	0.13	0.44	0.61
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	2.0	2.0	4.8	4.8	2.0	4.8	3.0
Lane Grp Cap (vph)	597	1659	516	317	1245	638	49	1163	520	434	1560	1023
v/s Ratio Prot	c0.19	0.27		0.08	0.22	c0.11	0.01	c0.32		c0.14	0.37	0.08
v/s Ratio Perm			0.02			0.24			0.10			0.23
v/c Ratio	1.11	0.83	0.06	0.86	0.89	0.86	0.67	0.98	0.29	1.10	0.85	0.48
Uniform Delay, d1	52.3	39.3	29.3	56.6	46.2	36.8	62.1	42.1	31.6	55.3	31.7	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	71.0	3.9	0.1	19.3	8.8	11.1	25.0	21.9	0.6	73.6	5.1	0.4
Delay (s)	123.3	43.2	29.4	75.9	55.0	47.9	87.1	64.1	32.2	128.9	36.7	13.7
Level of Service	F	D	C	E	D	D	F	E	C	F	D	B
Approach Delay (s)		67.9			55.9			58.0			50.8	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM Average Control Delay			58.0	HCM Level of Service				E				
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			126.6	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			92.0%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

Sutter Pointe EIR
 Cumulative Plus Project Phase 1 MIT No PP PM



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	
Lane Util. Factor		1.00			1.00				1.00			1.00	
Frt		1.00			0.98				0.86			0.86	
Flt Protected		1.00			1.00				1.00			1.00	
Satd. Flow (prot)		1860			1824				1611			1611	
Flt Permitted		1.00			1.00				1.00			1.00	
Satd. Flow (perm)		1860			1824				1611			1611	
Volume (vph)	0	1120	10	0	600	110	0	0	710	0	0	40	
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	1217	11	0	652	120	0	0	772	0	0	43	
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	207	0	0	30	
Lane Group Flow (vph)	0	1228	0	0	766	0	0	0	565	0	0	13	
Turn Type									custom			custom	
Protected Phases		2			6				4			4	
Permitted Phases													
Actuated Green, G (s)		68.0			68.0				34.0			34.0	
Effective Green, g (s)		68.0			68.0				34.0			34.0	
Actuated g/C Ratio		0.62			0.62				0.31			0.31	
Clearance Time (s)		4.0			4.0				4.0			4.0	
Vehicle Extension (s)		3.0			3.0				3.0			3.0	
Lane Grp Cap (vph)		1150			1128				498			498	
v/s Ratio Prot		c0.66			0.42				c0.35			0.01	
v/s Ratio Perm													
v/c Ratio		1.07			0.68				1.13			0.03	
Uniform Delay, d1		21.0			13.8				38.0			26.5	
Progression Factor		1.00			1.00				1.00			1.00	
Incremental Delay, d2		46.5			1.6				82.6			0.0	
Delay (s)		67.5			15.5				120.6			26.5	
Level of Service		E			B				F			C	
Approach Delay (s)		67.5			15.5			120.6			26.5		
Approach LOS		E			B			F			C		
Intersection Summary													
HCM Average Control Delay			67.2									HCM Level of Service	E
HCM Volume to Capacity ratio			1.09										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	8.0
Intersection Capacity Utilization			110.2%									ICU Level of Service	H
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP PM















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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	850	740	610	280	370	220	720	1220	380	330	1110	760
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)	924	804	663	304	402	239	783	1326	413	359	1207	826
RTOR Reduction (vph)	0	0	237	0	0	185	0	0	167	0	0	32
Lane Group Flow (vph)	924	804	426	304	402	54	783	1326	246	359	1207	794
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	3	8		7	4		1	6		5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	32.6	45.9	45.9	13.7	27.3	27.3	27.6	43.6	43.6	16.0	32.0	64.6
Effective Green, g (s)	34.1	47.6	47.6	15.2	28.7	28.7	29.1	45.3	45.3	17.5	33.7	67.8
Actuated g/C Ratio	0.24	0.34	0.34	0.11	0.20	0.20	0.21	0.32	0.32	0.12	0.24	0.48
Clearance Time (s)	5.5	5.7	5.7	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.5
Vehicle Extension (s)	1.0	5.9	5.9	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	1.0
Lane Grp Cap (vph)	827	1709	532	369	1031	321	706	1627	506	424	1210	803
v/s Ratio Prot	c0.27	0.16		0.09	0.08		c0.23	0.26		0.10	0.24	c0.24
v/s Ratio Perm			c0.27			0.03			0.16			0.26
v/c Ratio	1.12	0.47	0.80	0.82	0.39	0.17	1.11	0.81	0.49	0.85	1.00	0.99
Uniform Delay, d1	53.8	37.1	42.7	61.9	48.9	46.6	56.2	44.3	38.8	60.7	53.9	36.5
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	68.7	0.6	10.0	13.2	0.5	0.5	67.8	3.8	1.8	13.9	25.2	28.6
Delay (s)	122.5	37.6	52.7	75.1	49.4	47.1	124.1	48.1	40.5	74.6	79.1	65.2
Level of Service	F	D	D	E	D	D	F	D	D	E	E	E
Approach Delay (s)		74.6			57.1			70.4			73.6	
Approach LOS		E			E			E			E	

Intersection Summary

HCM Average Control Delay	71.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	141.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			













HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP PM

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑↑	↗		↑↑↑	↗				↘		↗	
Ideal Flow (vphpl)	1900	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0		4.0	4.0				4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00		0.86	0.86				1.00	1.00	1.00	
Frt		1.00	0.85		0.98	0.85				1.00	1.00	0.85	
Flt Protected		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (prot)		3539	1667		4716	1362				1770	1583	1583	
Flt Permitted		1.00	1.00		1.00	1.00				0.95	1.00	1.00	
Satd. Flow (perm)		3539	1667		4716	1362				1770	1583	1583	
Volume (vph)	0	1350	1490	0	1690	1390	0	0	0	80	0	140	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	1392	1536	0	1742	1433	0	0	0	82	0	144	
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	0	0	0	6	
Lane Group Flow (vph)	0	1392	1536	0	1978	1184	0	0	0	82	0	138	
Turn Type			Free			Free				Prot		custom	
Protected Phases		2			6					4			
Permitted Phases			Free			Free						4	
Actuated Green, G (s)		49.9	70.0		49.9	70.0				12.1		12.1	
Effective Green, g (s)		49.9	70.0		49.9	70.0				12.1		12.1	
Actuated g/C Ratio		0.71	1.00		0.71	1.00				0.17		0.17	
Clearance Time (s)		4.0			4.0					4.0		4.0	
Vehicle Extension (s)		3.0			3.0					3.0		3.0	
Lane Grp Cap (vph)		2523	1667		3362	1362				306		274	
v/s Ratio Prot		0.39			0.42					0.05			
v/s Ratio Perm			c0.92			0.87						0.09	
v/c Ratio		0.55	0.92		0.59	0.87				0.27		0.50	
Uniform Delay, d1		4.8	0.0		5.0	0.0				25.1		26.2	
Progression Factor		1.24	1.00		0.49	1.00				1.00		1.00	
Incremental Delay, d2		0.5	6.3		0.2	2.4				0.5		1.5	
Delay (s)		6.4	6.3		2.7	2.4				25.6		27.7	
Level of Service		A	A		A	A				C		C	
Approach Delay (s)		6.3			2.6			0.0			26.9		
Approach LOS		A			A			A			C		
Intersection Summary													
HCM Average Control Delay			5.2									HCM Level of Service	A
HCM Volume to Capacity ratio			0.92										
Actuated Cycle Length (s)			70.0									Sum of lost time (s)	0.0
Intersection Capacity Utilization			58.3%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												

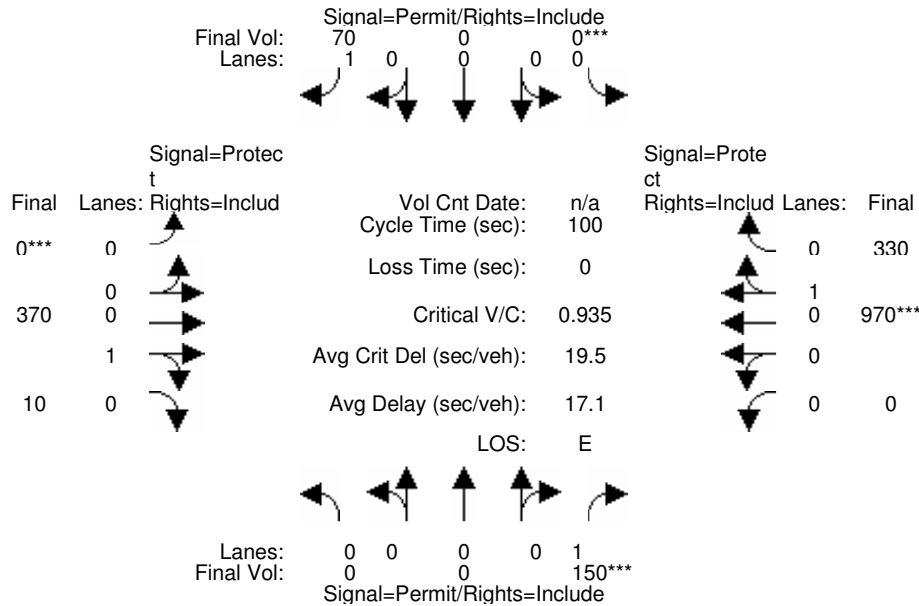
HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project Phase 1 MIT No PP PM

												
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			
Lane Util. Factor		0.95	1.00		0.91	1.00	0.95	0.86	0.91			
Frt		1.00	0.85		1.00	0.85	1.00	0.91	0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95	0.98	1.00			
Satd. Flow (prot)		3539	1583		5085	1583	1681	1435	2882			
Flt Permitted		1.00	1.00		1.00	1.00	0.95	0.98	1.00			
Satd. Flow (perm)		3539	1583		5085	1583	1681	1435	2882			
Volume (vph)	0	1130	300	0	2100	160	980	0	1640	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1165	309	0	2165	165	1010	0	1691	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	17	32	0	0	0
Lane Group Flow (vph)	0	1165	309	0	2165	165	701	697	1254	0	0	0
Turn Type			Free			Free	Prot		custom			
Protected Phases		2			6		4		8			
Permitted Phases			Free			Free						4
Actuated Green, G (s)		31.0	70.0		31.0	70.0	31.0	31.0	31.0			
Effective Green, g (s)		31.0	70.0		31.0	70.0	31.0	31.0	31.0			
Actuated g/C Ratio		0.44	1.00		0.44	1.00	0.44	0.44	0.44			
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)		1567	1583		2252	1583	744	636	1276			
v/s Ratio Prot		0.33			c0.43		0.42	c0.49				
v/s Ratio Perm			0.20			0.10			0.44			
v/c Ratio		0.74	0.20		0.96	0.10	0.94	1.10	0.98			
Uniform Delay, d1		16.2	0.0		18.9	0.0	18.6	19.5	19.2			
Progression Factor		1.00	1.00		1.10	1.00	1.00	1.00	1.00			
Incremental Delay, d2		2.8	0.2		9.4	0.1	20.1	64.6	21.0			
Delay (s)		19.0	0.2		30.1	0.1	38.8	84.1	40.3			
Level of Service		B	A		C	A	D	F	D			
Approach Delay (s)		15.1			28.0			51.5			0.0	
Approach LOS		B			C			D			A	
Intersection Summary												
HCM Average Control Delay			34.8				HCM Level of Service		C			
HCM Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)		8.0			
Intersection Capacity Utilization			84.4%				ICU Level of Service		E			
Analysis Period (min)			15									
c	Critical Lane Group											

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 AM

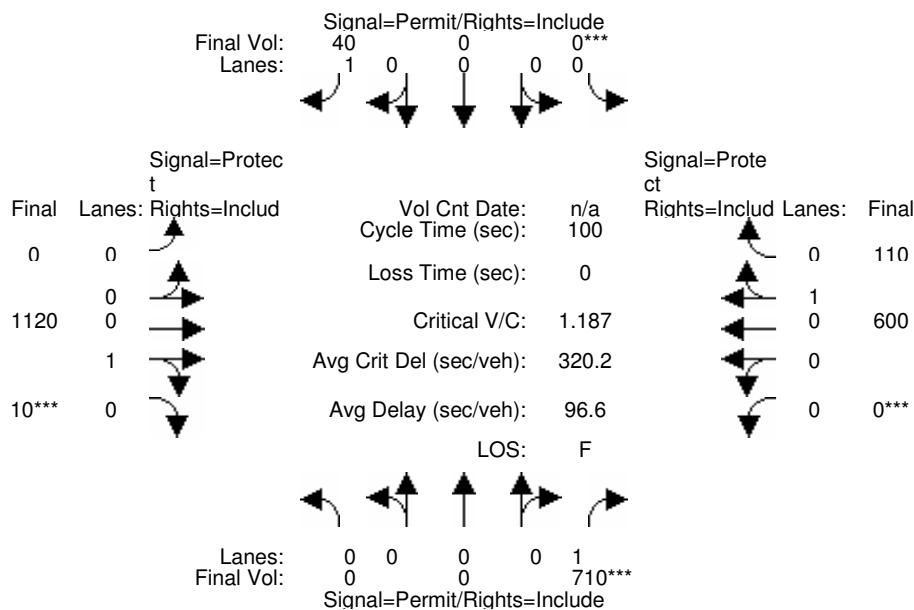
Intersection #116: MIT-Elverta Road / East Levee Road



Street Name:	East Levee Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	150	0	0	70	0	370	10	0	970	330
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	150	0	0	70	0	370	10	0	970	330
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	150	0	0	70	0	370	10	0	970	330
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	150	0	0	70	0	370	10	0	970	330
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	150	0	0	70	0	370	10	0	970	330
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	150	0	0	70	0	370	10	0	970	330
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.97	0.03	0.00	0.75	0.25
Final Sat.:	0	0	1550	0	0	1550	0	1509	41	0	1157	393
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.10	0.00	0.00	0.05	0.00	0.25	0.25	0.00	0.84	0.84
Crit Volume:			150			0			0			1300
Crit Moves:			****			****			****			****

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 PM

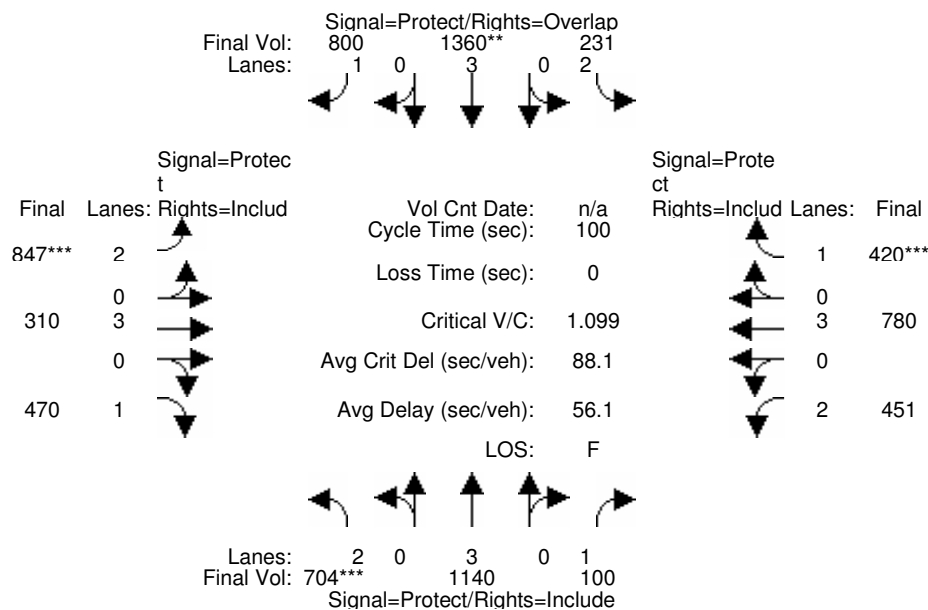
Intersection #116: MIT-Elverta Road / East Levee Road



Street Name:	East Levee Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	710	0	0	40	0	1120	10	0	600	110
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	710	0	0	40	0	1120	10	0	600	110
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	710	0	0	40	0	1120	10	0	600	110
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	710	0	0	40	0	1120	10	0	600	110
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	710	0	0	40	0	1120	10	0	600	110
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	710	0	0	40	0	1120	10	0	600	110
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.99	0.01	0.00	0.85	0.15
Final Sat.:	0	0	1550	0	0	1550	0	1536	14	0	1310	240
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.46	0.00	0.00	0.03	0.00	0.73	0.73	0.00	0.46	0.46
Crit Volume:			710			0			1130			0
Crit Moves:			***			***			***			***

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Phase 1 AM

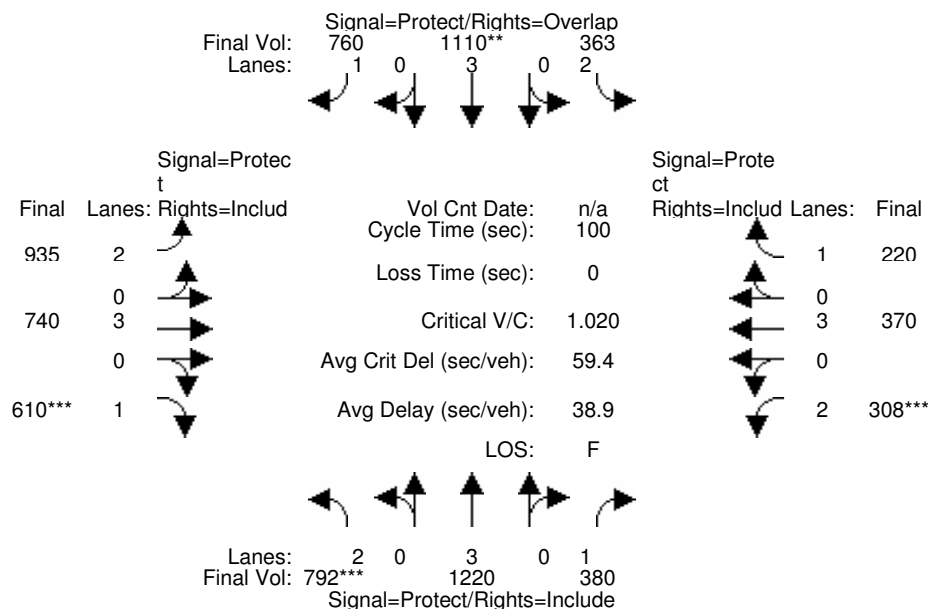
Intersection #120: MIT-Elverta Road / Watt avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	640	1140	100	210	1360	800	770	310	470	410	780	420
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	640	1140	100	210	1360	800	770	310	470	410	780	420
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	640	1140	100	210	1360	800	770	310	470	410	780	420
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	640	1140	100	210	1360	800	770	310	470	410	780	420
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	640	1140	100	210	1360	800	770	310	470	410	780	420
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
Final Volume:	704	1140	100	231	1360	800	847	310	470	451	780	420
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.23	0.25	0.07	0.08	0.30	0.53	0.28	0.07	0.31	0.15	0.17	0.28
Crit Volume:	352			453			424			420		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Phase 1 PM

Intersection #120: MIT-Elverta Road / Watt avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	720	1220	380	330	1110	760	850	740	610	280	370	220
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	720	1220	380	330	1110	760	850	740	610	280	370	220
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	720	1220	380	330	1110	760	850	740	610	280	370	220
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	720	1220	380	330	1110	760	850	740	610	280	370	220
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	720	1220	380	330	1110	760	850	740	610	280	370	220
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	792	1220	380	363	1110	760	935	740	610	308	370	220
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.26	0.27	0.25	0.12	0.25	0.51	0.31	0.16	0.41	0.10	0.08	0.15
Crit Volume:	396				370				610	154		
Crit Moves:	****				****				****	****		

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	4
Free-flow speed on freeway	65.0 mph
Volume on freeway	6000 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	360 vph
Length of first accel/decel lane	200 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	6000	360	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1630	98	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7337	401	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.168 Using Equation 4
FM
 $v = v(P) = 1230$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	7738	9400	No
v v	3053 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		Yes	
3 or av34			
Is v v > 1.5 v /2		Yes	
3 or av34	12		
If yes, v = 2934		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	2934	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 30.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.413
S
Space mean speed in ramp influence area, S = 55.5 mph
R
Space mean speed in outer lanes, S = 58.9 mph
O
Space mean speed for all vehicles, S = 57.4 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 4
 Density, D 22.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4760 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1293 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1455 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1455 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 60.2 mi/h
 Number of lanes, N 3
 Density, D 34.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5078 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1380 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2070 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2070 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.9 mi/h
 Number of lanes, N 3
 Density, D 24.6 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: Airport Blvd to SR 99
 Jurisdiction: Sutter County
 Analysis Year:
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4238 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1152 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1597 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1597 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7910 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1310 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	7910	1310	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	2149	356	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8942	1460	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 4722$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	8942	9400	No
Fi F			
v = v - v	7482	9400	No
FO F R			
v	1460	2100	No
R			
v v	2110 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v = 4722		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4722	4400	Yes

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 40.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.429$
S
Space mean speed in ramp influence area, $S = 55.1$ mph
R
Space mean speed in outer lanes, $S = 67.0$ mph
0
Space mean speed for all vehicles, $S = 60.1$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 15.2 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year:
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2429 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 660 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 990 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 990 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 2429 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 770 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2429	770	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	660	209	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	2970		858		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.646 Using Equation 5
FD
 $v = v + (v - v) P = 2223$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2970	7050	No
Fi F			
$v = v - v$	2112	7050	No
FO F R			
v	858	2100	No
R			
$v = v$	747 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 2223		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2223	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 20.7$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.375$
S
Space mean speed in ramp influence area, $S = 56.4$ mph
R
Space mean speed in outer lanes, $S = 71.3$ mph
0
Space mean speed for all vehicles, $S = 59.5$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 1890 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 130 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1890	130	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	514	35	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2311	145	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 1367$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2456	7050	No
$v v$	944 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 1367		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	1367	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 14.1$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.314
S
Space mean speed in ramp influence area, S = 57.8 mph
R
Space mean speed in outer lanes, S = 63.4 mph
O
Space mean speed for all vehicles, S = 59.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/8
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 1981 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 380 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1981	380	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	538	103	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2422	423	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 1433$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2845 7050 No
FO
v v 989 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = 1433 (Equation 25-8)
12A

Flow Entering Merge Influence Area

Actual Max Desirable Violation?
v 1433 4600 No
R12

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 16.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.301
S
Space mean speed in ramp influence area, S = 58.1 mph
R
Space mean speed in outer lanes, S = 63.2 mph
0
Space mean speed for all vehicles, S = 59.8 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 14.1 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2247 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 611 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 916 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 916 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 2247 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2247	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	611	155	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	2748		635		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.662 Using Equation 5
FD
 $v = v + (v - v) P = 2034$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2748	7050	No
Fi F			
$v = v - v$	2113	7050	No
FO F R			
v	635	2100	No
R			
$v = v$	714 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 2034		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2034	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 21.7$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = 71.3$ mph
0
Space mean speed for all vehicles, $S = 60.0$ mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road OFF RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description: Aux Lane Added

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1939 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1500 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane 1300 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1939	1500	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	527	408	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2371	1671	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2371$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2371	4700	No
Fi F			
$v = v - v$	700	4700	No
FO F R			
v	1671	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 2371$		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2371	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 12.9$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.448$
S
Space mean speed in ramp influence area, $S = 54.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1848 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 90 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1848	90	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	502	24	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2260	100	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2260$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2360	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 2260		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	2260	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.7$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.337
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.2 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1911 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 40 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1911	40	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	519	11	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2337	45	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2337$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2382	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 2337		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	2337	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.9$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.318
S
Space mean speed in ramp influence area, S = 57.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.7 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 18.2 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1939 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 527 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1186 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1186 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 372 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 838 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 838 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road LOOP ON RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 889 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 50 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	889	50	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	242	14	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1087	56	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1087$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 1143 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, $v = 1087$ (Equation 25-8)
12A

Flow Entering Merge Influence Area

Actual Max Desirable Violation?
v 1087 4600 No
R12

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.304
S
Space mean speed in ramp influence area, S = 58.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road SLIP ON RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 939 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 50 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	939	50	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	255	14	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1148	56	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1148$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 1204 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, $v = 1148$ (Equation 25-8)
12A

Flow Entering Merge Influence Area

Actual Max Desirable Violation?
v 1148 4600 No
R12

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.281
S
Space mean speed in ramp influence area, S = 58.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Road LOOP ON RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1939 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 1720 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1939	1720	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	527	467	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2192	1916	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2192$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4108 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = 2192 (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	2192	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 32.9$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.529
S
Space mean speed in ramp influence area, S = 52.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.8 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 372 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 838 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 838 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction:
Jurisdiction: Riego Road SLIP ON RAMP
Analysis Year: Cum PP1 NPP Interim MIT
Description: Aux Lane Added

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	3143 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	420 vph
Length of first accel/decel lane	1000 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	3143	420	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	854	114	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3553	468	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3553$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4021	4700	No
v v	0	pc/h	(Equation 25-4 or 25-5)
	3 or av34		
Is v v	> 2700	pc/h?	No
	3 or av34		
Is v v	> 1.5 v /2		No
	3 or av34	12	
If yes, v	= 3553		(Equation 25-8)
	12A		

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	3553	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 30.4$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.448
S
Space mean speed in ramp influence area, S = 54.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.7 mph

Average passenger-car speed, S 64.2 mi/h
 Number of lanes, N 2
 Density, D 27.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMo
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3110 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 845 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1758 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1758 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.3 mi/h
 Number of lanes, N 2
 Density, D 27.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3090 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 840 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1747 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1747 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Cum PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2163 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 320 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2163	320	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	588	87	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	2445		357		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2445$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2445	4700	No
Fi F			
$v = v - v$	2088	4700	No
FO F R			
v	357	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 2445$		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2445	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 24.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.330$
S
Space mean speed in ramp influence area, $S = 57.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.4$ mph

Average passenger-car speed, S 62.3 mi/h
 Number of lanes, N 2
 Density, D 31.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3437 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 934 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1943 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1943 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3437 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 490 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3437	490	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	934	133	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3885		546		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3885$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	3885	4700	No
Fi F			
v = v - v	3339	4700	No
FO F R			
v	546	2100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v = 3885		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3885	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 35.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.347$
S
Space mean speed in ramp influence area, $S = 57.0$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.0$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3094 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 820 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3094	820	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	841	223	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3498	914	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3498$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4412	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 3498$		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	3498	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.3$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $M = 0.617$
S
Space mean speed in ramp influence area, $S = 50.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 50.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3668 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 30 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3668	30	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	997	8	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4146	33	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4146$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4179 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, $v = 4146$ (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	4146	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.531
S
Space mean speed in ramp influence area, S = 52.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.8 mph

Average passenger-car speed, S 59.8 mi/h
 Number of lanes, N 2
 Density, D 34.8 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3689 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1002 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2085 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2085 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year:
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3689 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 530 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3689	530	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1002	144	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4170		590		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4170$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4170	4700	No
Fi F			
$v = v - v$	3580	4700	No
FO F R			
v	590	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 4170$		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4170	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 22.1$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.351$
S
Space mean speed in ramp influence area, $S = 56.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3318 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 940 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3318	940	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	902	255	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3751	1047	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3751 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4798	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v = 3751		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	3751	4600	Yes

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 39.3 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.769
S
Space mean speed in ramp influence area, S = 47.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 47.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4080 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4080	170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1109	46	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4612	189	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4612 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4801	4700	Yes
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v = 4612		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	4612	4600	Yes

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 39.7 pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.750
S
Space mean speed in ramp influence area, S = 47.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 47.7 mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/20/08
Analysis Time Period: AM Peak Period
Freeway/Direction: SR 99 SB
From/To: Elkhorn Blvd to I-5
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Flow Inputs and Adjustments

Volume, V	4095	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1113	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi

Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fhV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	2315	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2315	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	53.5	mi/h
Number of lanes, N	2	
Density, D	43.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP1 NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4095 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1416 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4095	1416	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1113	385	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4629	1578	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4629$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4629	4700	No
Fi F			
v	4629	4400	Yes
12			
v = v - v	3051	4700	No
FO F R			
v	1578	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 30.6$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D = 0.180
S
Space mean speed in ramp influence area, S = 60.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 60.9 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP1 NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3662 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1416 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3662	1416	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	995	385	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4140	1578	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2565 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5718	7050	No
FO			
v	4143	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 27.7 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.372
S
Space mean speed in ramp influence area, S = 56.5 mph
R
Space mean speed in outer lanes, S = 61.1 mph
0
Space mean speed for all vehicles, S = 57.7 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP1 NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4238 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 592 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4238	592	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1152	161	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4791	660	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.610 Using Equation 5
FD
 $v = v + (v - v) P = 3179$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4791	7050	No
Fi F			
v	3179	4400	No
12			
v = v - v	4131	7050	No
FO F R			
v	660	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 18.1$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D = 0.097
S
Space mean speed in ramp influence area, S = 62.8 mph
R
Space mean speed in outer lanes, S = 68.9 mph
0
Space mean speed for all vehicles, S = 64.7 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP1 NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	1889 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	592 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	1889	592	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	513	161	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2310	660	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2310$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2970	4700	No
FO			
v	2970	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 18.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.202
S
Space mean speed in ramp influence area, S = 60.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 60.4 mph

Leisch Method for Weaving Analysis

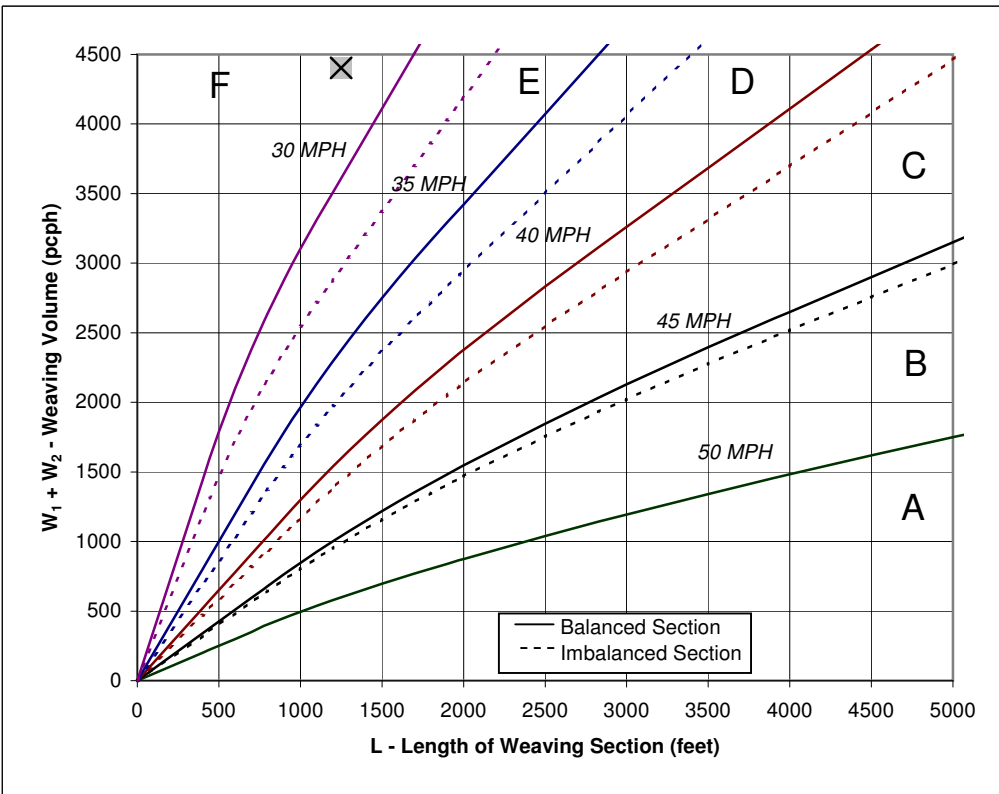
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

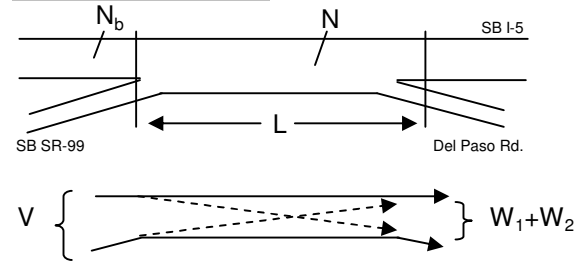
Project Information

Project	South Sutter County
Scenario	Cumulative PP1 NPP - AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	6,631	2,985	1,310
Truck Percentage	8%	5%	5%
PCE for Trucks	1.5	1.5	1.5
Volume (pcph)	6,896	3,060	1,343



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **22.2**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,395**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	4760	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	4760	2019
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.8889
----------	--------

v_i	5820.652	pc/hr/ln
-------	----------	----------

Density, D	21.1	pc/mi/ln
-------------------	------	----------

LOS	C
------------	---

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP NPP1 AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

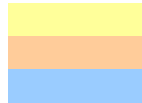
Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	4
Free-flow speed on freeway	65.0 mph
Volume on freeway	7980 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	740 vph
Length of first accel/decel lane	200 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	7980	740	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	2057	191	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8556	782	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.120 Using Equation 4
FM
 $v = v(P) = 1027$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	9338	9400	No
v v	3764 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		Yes	
3 or av34			
Is v v > 1.5 v /2		Yes	
3 or av34	12		
If yes, v = 3422		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	3422	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.564
S
Space mean speed in ramp influence area, S = 52.0 mph
R
Space mean speed in outer lanes, S = 56.9 mph
O
Space mean speed for all vehicles, S = 54.6 mph

Average passenger-car speed, S 62.8 mi/h
 Number of lanes, N 4
 Density, D 30.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 7120 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1835 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1908 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1908 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.4 mi/h
 Number of lanes, N 3
 Density, D 26.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4842 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1248 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1730 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1730 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 63.8 mi/h
 Number of lanes, N 3
 Density, D 28.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4972 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1281 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1811 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1811 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 7130 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 780 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	7130	780	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1838	201	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 7792 824 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 3862$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	7792	9400	No
Fi F			
v = v - v	6968	9400	No
FO F R			
v	824	2100	No
R			
v v	1965 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v = 3862		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3862	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 33.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.372$
S
Space mean speed in ramp influence area, $S = 56.4$ mph
R
Space mean speed in outer lanes, $S = 67.5$ mph
0
Space mean speed for all vehicles, $S = 61.5$ mph

Average passenger-car speed, S 64.8 mi/h
 Number of lanes, N 3
 Density, D 25.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4590 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1183 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1640 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1640 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4590 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	4590	1580	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1183	407	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4921		1670		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.560 Using Equation 5
FD
 $v = v + (v - v) P = 3491$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4921	7050	No
Fi F			
$v = v - v$	3251	7050	No
FO F R			
v	1670	2100	No
R			
$v = v$	1430 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 3491$		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3491	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 31.6$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.448$
S
Space mean speed in ramp influence area, $S = 54.7$ mph
R
Space mean speed in outer lanes, $S = 69.6$ mph
0
Space mean speed for all vehicles, $S = 58.3$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3227 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 260 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3227	260	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	832	67	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3460	275	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 2047$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3735	7050	No
$v v$	1413 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 2047		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	2047	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.3$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.336
S
Space mean speed in ramp influence area, S = 57.3 mph
R
Space mean speed in outer lanes, S = 61.7 mph
O
Space mean speed for all vehicles, S = 58.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3409 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 400 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3409	400	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	879	103	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3655	423	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 2162$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4078	7050	No
$v v$	1493 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 2162		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	2162	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.3$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.328
S
Space mean speed in ramp influence area, S = 57.5 mph
R
Space mean speed in outer lanes, S = 61.4 mph
O
Space mean speed for all vehicles, S = 58.9 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 20.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3689 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 951 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1318 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1318 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3689 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 840 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3689	840	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	951	216	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3955		888		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.620 Using Equation 5
FD
 $v = v + (v - v) P = 2790$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	3955	7050	No
Fi F			
v = v - v	3067	7050	No
FO F R			
v	888	2100	No
R			
v v	1165 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v = 2790		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2790	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.378$
S
Space mean speed in ramp influence area, $S = 56.3$ mph
R
Space mean speed in outer lanes, $S = 70.7$ mph
0
Space mean speed for all vehicles, $S = 59.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	3101 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	25.0 mph
Volume on ramp	390 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3101	390	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	799	101	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3325	412	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 3325$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3737	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v	> 2700 pc/h?	No	
3 or av34			
Is v v	> 1.5 v /2	No	
3 or av34	12		
If yes, v	= 3325	(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	3325	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.3$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.460
S
Space mean speed in ramp influence area, S = 54.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.4 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3374 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 200 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3374	200	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	870	52	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3617	211	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3617$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3828	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 3617		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	3617	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 32.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.455
S
Space mean speed in ramp influence area, S = 54.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.5 mph

Average passenger-car speed, S 63.1 mi/h
 Number of lanes, N 2
 Density, D 29.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riega Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3514 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 906 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1884 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1884 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road OFF RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description: Aux Lane Added

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3514 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 2620 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane 1300 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3514	2620	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	906	675	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3768	2769	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3768$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	3768	4700	No
Fi F			
v = v - v	999	4700	No
FO F R			
v	2769	4100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v = 3768		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3768	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 25.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.547$
S
Space mean speed in ramp influence area, $S = 52.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 52.4$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.6 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riega Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2860 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 737 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1533 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1533 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road LOOP ON RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 894 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 300 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	894	300	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	243	82	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1011	334	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1011$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1345	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 1011		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	1011	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.306
S
Space mean speed in ramp influence area, S = 58.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road SLIP ON RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description:

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	1194 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	160 vph
Length of first accel/decel lane	590 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	1194	160	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	324	43	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1350	178	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1350$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1528	4700	No
v v	0	pc/h	(Equation 25-4 or 25-5)
	3 or av34		
Is v v	> 2700	pc/h?	No
	3 or av34		
Is v v	> 1.5 v /2		No
	3 or av34	12	
If yes, v	= 1350		(Equation 25-8)
	12A		

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	1350	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.286
S
Space mean speed in ramp influence area, S = 58.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.4 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2870 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 740 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1539 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1539 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1600 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 412 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 874 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 874 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Road LOOP ON RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 959 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 1390 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	959	1390	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	247	358	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1048	1469	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1048$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2517 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, $v = 1048$ (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	1048	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.340
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.2 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1590 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 410 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 869 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 869 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Road SLIP ON RAMP
Jurisdiction:
Analysis Year: Cum PP1 NPP Interim MIT
Description: Aux Lane Added

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	1932 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	1490 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	1932	1490	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	498	384	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2111	1574	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2111$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3685	4700	No
v/v	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v/v > 2700$ pc/h?		No	
3 or av34			
Is $v/v > 1.5 v/2$		No	
3 or av34	12		
If yes, v = 2111		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	2111	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.1$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.341
S
Space mean speed in ramp influence area, S = 57.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.1 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego Off
Jurisdiction: Sutter County
Analysis Year: Cum PP Phase 1 Interim
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1113 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 220 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1113	220	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	287	57	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 1216 232 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1216$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1216	4700	No
Fi F			
$v = v - v$	984	4700	No
FO F R			
v	232	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 1216$		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1216	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 13.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.319$
S
Space mean speed in ramp influence area, $S = 57.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.7$ mph

Average passenger-car speed, S 64.8 mi/h
 Number of lanes, N 2
 Density, D 25.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2975 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 767 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1626 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1626 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2975 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 430 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2975	430	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	767	111	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3251		454		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3251$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3251	4700	No
Fi F			
$v = v - v$	2797	4700	No
FO F R			
v	454	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 3251$		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3251	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 29.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.339$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2674 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 500 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2674	500	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	689	129	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2922	528	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2922$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3450	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 2922		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	2922	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 29.0$ pc/mi/ln
R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.419
S
Space mean speed in ramp influence area, S = 55.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.4 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3024 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3024	330	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	779	85	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3305	349	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3305$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3654	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 3305		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	3305	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 30.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.427
S
Space mean speed in ramp influence area, S = 55.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.2 mph

Average passenger-car speed, S 64.1 mi/h
 Number of lanes, N 2
 Density, D 27.8 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/20/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP Phase 1 NPP MIT
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3255 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 839 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1779 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1779 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn Off
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3255 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 770 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane 0 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3255	770	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	839	198	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3557		814		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3557$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3557	4700	No
Fi F			
$v = v - v$	2743	4700	No
FO F R			
v	814	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v = 3557$		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3557	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 16.8$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.371$
S
Space mean speed in ramp influence area, $S = 56.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.5$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On1
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2716 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 390 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2716	390	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	700	101	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2968	412	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2968$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 3380 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, $v = 2968$ (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	2968	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.411
S
Space mean speed in ramp influence area, S = 55.6 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.6 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/20/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn On2
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2989 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 140 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2989	140	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	770	36	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3266	148	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3266$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3414	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v = 3266		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
R12	3266	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.395
S
Space mean speed in ramp influence area, S = 55.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.9 mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/20/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 SB
From/To: Elkhorn Blvd to I-5
Jurisdiction: Sutter County
Analysis Year: Cumulative PP Phase 1 NPP MIT
Description: South Sutter

Flow Inputs and Adjustments

Volume, V	3087	veh/h
Peak-hour factor, PHF	0.97	
Peak 15-min volume, v15	796	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi

Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fhV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1687	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1687	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.6	mi/h
Number of lanes, N	2	
Density, D	26.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP1 NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3087 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1002 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	3087	1002	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	796	258	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3373	1059	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3373$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	3373	4700	No
Fi F			
v	3373	4400	No
12			
v = v - v	2314	4700	No
FO F R			
v	1059	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 19.8$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.133$
S
Space mean speed in ramp influence area, $S = 61.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP1 NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3840 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1002 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3840	1002	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	990	258	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4117	1059	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2550 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5176	7050	No
FO			
v	3609	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.7 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.270
S
Space mean speed in ramp influence area, S = 58.8 mph
R
Space mean speed in outer lanes, S = 61.2 mph
0
Space mean speed for all vehicles, S = 59.5 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4972 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1150 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	4972	1150	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1281	296	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5433	1215	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.568 Using Equation 5
FD
 $v = v + (v - v) P = 3612$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5433	7050	No
Fi F			
v	3612	4400	No
12			
v = v - v	4218	7050	No
FO F R			
v	1215	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 21.8$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.147$
S
Space mean speed in ramp influence area, $S = 61.6$ mph
R
Space mean speed in outer lanes, $S = 68.1$ mph
0
Space mean speed for all vehicles, $S = 63.6$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP1 NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3416 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1150 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3416	1150	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	880	296	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3663	1215	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3663 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4878	4700	Yes
FO			
v	4878	4600	Yes
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.6 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M = 0.638
S
Space mean speed in ramp influence area, S = 50.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 50.3 mph

Leisch Method for Weaving Analysis

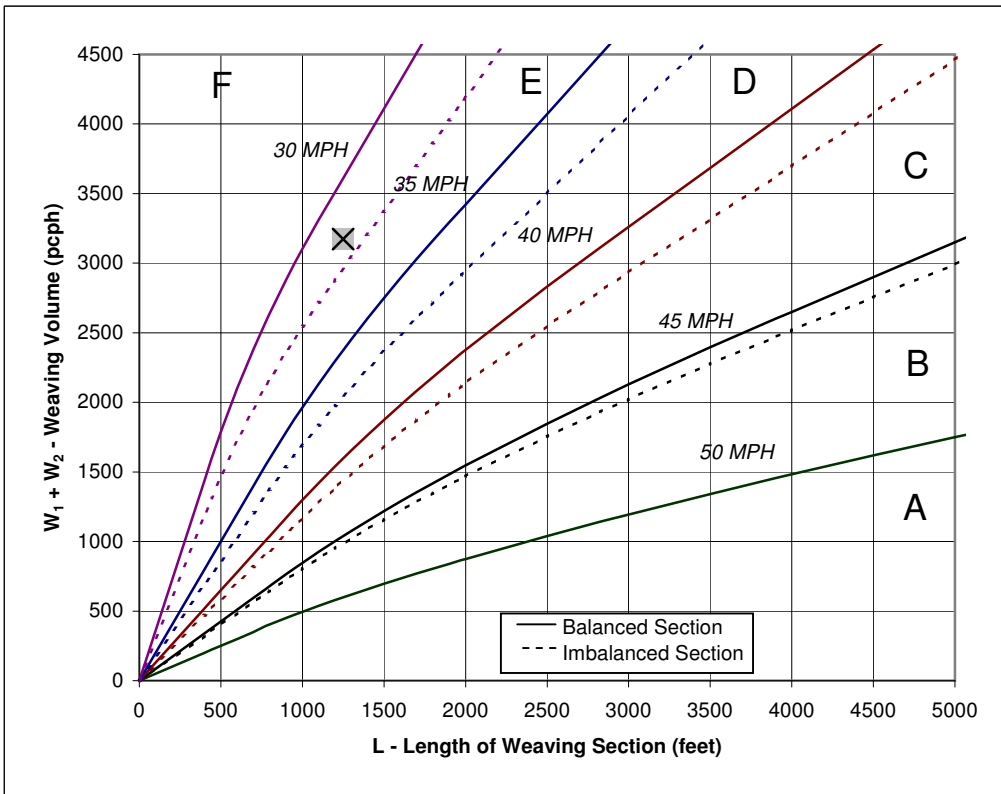
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

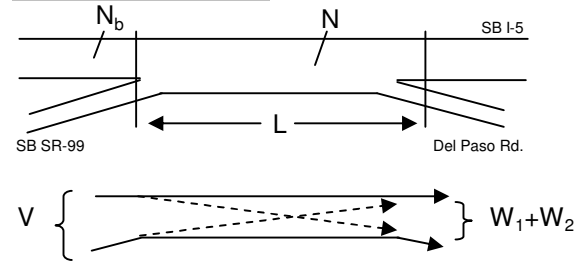
Project Information

Project	South Sutter County
Scenario	Cumulative PP NPP1 - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,138	Volume (vph)*	2,316	Volume (vph)*	780
Truck Percentage	12%	Truck Percentage	5%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	6,506	Volume (pcph)	2,374	Volume (pcph)	800



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? N
[If optional exit lane, then "Y". Otherwise "N".]
- 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 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) 25.7
- Weaving Intensity Factor (k) 3.00
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ 2,026
- Level of Service (LOS) F

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	7120	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	7120	3985
Lanes	3	2
Capacity Check	LOS F	OK

f_{HV}	0.9615
----------	--------

v_i	7633.814	pc/hr/ln
-------	----------	----------

Density, D	27.7	pc/mi/ln
-------------------	-------------	----------

LOS	LOS F
------------	--------------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP1 NPP PM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



CUMULATIVE CONDITIONS
PLUS PROJECT
NO PLACER PARKWAY
WITH MITIGATION MEASURES

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

South Sutter
Cumulative PP NPP MIT - AM Peak

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
Lane Util. Factor	1.00	1.00		0.94	1.00	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		4990	1863	1583	1770	4150	1583	3433	4803	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		4990	1863	1583	1770	4150	1583	3433	4803	1583
Volume (vph)	10	10	10	860	10	190	10	1170	900	440	2430	10
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)	11	11	11	935	11	207	11	1272	978	478	2641	11
RTOR Reduction (vph)	0	10	0	0	0	31	0	0	0	0	0	2
Lane Group Flow (vph)	11	12	0	935	11	176	11	1272	978	478	2641	9
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		pm+ov	Prot		Free	Prot		Perm
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases						8			Free			6
Actuated Green, G (s)	0.7	8.6		26.3	34.2	55.4	1.4	59.1	131.2	21.2	78.9	78.9
Effective Green, g (s)	0.7	8.6		26.3	34.2	55.4	1.4	59.1	131.2	21.2	78.9	78.9
Actuated g/C Ratio	0.01	0.07		0.20	0.26	0.42	0.01	0.45	1.00	0.16	0.60	0.60
Clearance Time (s)	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
Lane Grp Cap (vph)	9	113		1000	486	717	19	1869	1583	555	2888	952
v/s Ratio Prot	0.01	0.01		c0.19	0.01	0.04	0.01	0.31		0.14	c0.55	
v/s Ratio Perm						0.07			c0.62			0.01
v/c Ratio	1.22	0.10		0.94	0.02	0.25	0.58	0.68	0.62	0.86	0.91	0.01
Uniform Delay, d1	65.2	57.7		51.6	36.1	24.4	64.6	28.6	0.0	53.6	23.2	10.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	385.4	0.4		15.1	0.0	0.2	36.3	1.0	1.8	12.9	5.0	0.0
Delay (s)	450.7	58.1		66.8	36.1	24.6	100.9	29.6	1.8	66.5	28.2	10.5
Level of Service	F	E		E	D	C	F	C	A	E	C	B
Approach Delay (s)		188.9			58.9			17.9			34.0	
Approach LOS		F			E			B			C	

Intersection Summary

HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	131.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Riego Rd &

South Sutter
Cumulative PP NPP MIT - AM Peak

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	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1676		1770	1601	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	3433	1676		1770	1601	
Volume (vph)	50	760	230	100	1160	100	960	10	20	100	10	150
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)	54	826	250	109	1261	109	1043	11	22	109	11	163
RTOR Reduction (vph)	0	0	182	0	0	63	0	16	0	0	97	0
Lane Group Flow (vph)	54	826	68	109	1261	46	1043	17	0	109	77	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		4	8		7	3	
Permitted Phases			2			6						
Actuated Green, G (s)	4.3	28.9	28.9	9.3	33.9	33.9	40.9	27.1		25.3	11.5	
Effective Green, g (s)	4.3	28.9	28.9	9.3	33.9	33.9	40.9	27.1		25.3	11.5	
Actuated g/C Ratio	0.04	0.27	0.27	0.09	0.32	0.32	0.38	0.25		0.24	0.11	
Clearance Time (s)	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	
Lane Grp Cap (vph)	71	1379	429	154	1617	503	1317	426		420	173	
v/s Ratio Prot	0.03	0.16		c0.06	c0.25		c0.30	0.01		0.06	c0.05	
v/s Ratio Perm			0.04			0.03						
v/c Ratio	0.76	0.60	0.16	0.71	0.78	0.09	0.79	0.04		0.26	0.44	
Uniform Delay, d1	50.6	33.8	29.6	47.3	33.0	25.5	29.1	29.9		33.0	44.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	37.3	0.7	0.2	13.8	2.5	0.1	3.3	0.0		0.3	1.8	
Delay (s)	88.0	34.5	29.8	61.2	35.4	25.6	32.4	30.0		33.4	46.4	
Level of Service	F	C	C	E	D	C	C	C		C	D	
Approach Delay (s)		36.0			36.6			32.4			41.4	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay			35.6				HCM Level of Service				D	
HCM Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			106.6				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			76.3%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												


































HCM Signalized Intersection Capacity Analysis
 10: Baseline Rd & Locust Rd

South Sutter
 Cumulative PP NPP MIT - AM Peak

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	0.95	1.00	1.00	0.95	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	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1723	
Volume (vph)	10	830	40	90	1270	550	80	40	50	50	10	10
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)	11	902	43	98	1380	598	87	43	54	54	11	11
RTOR Reduction (vph)	0	0	25	0	0	306	0	0	43	0	9	0
Lane Group Flow (vph)	11	902	18	98	1380	292	87	43	11	54	13	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			
Actuated Green, G (s)	0.6	25.4	25.4	5.4	30.2	30.2	4.2	12.9	12.9	2.2	10.9	
Effective Green, g (s)	0.6	25.4	25.4	5.4	30.2	30.2	4.2	12.9	12.9	2.2	10.9	
Actuated g/C Ratio	0.01	0.41	0.41	0.09	0.49	0.49	0.07	0.21	0.21	0.04	0.18	
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)	17	1452	650	154	1727	772	120	388	330	63	303	
v/s Ratio Prot	0.01	0.25		c0.06	c0.39		c0.05	c0.02		0.03	0.01	
v/s Ratio Perm			0.01			0.18			0.01			
v/c Ratio	0.65	0.62	0.03	0.64	0.80	0.38	0.72	0.11	0.03	0.86	0.04	
Uniform Delay, d1	30.5	14.4	10.9	27.3	13.3	10.0	28.3	19.9	19.5	29.7	21.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	62.0	0.8	0.0	8.3	2.7	0.3	19.4	0.1	0.0	64.9	0.1	
Delay (s)	92.5	15.3	10.9	35.6	16.0	10.3	47.7	20.0	19.6	94.5	21.2	
Level of Service	F	B	B	D	B	B	D	B	B	F	C	
Approach Delay (s)		16.0			15.3			33.0			73.3	
Approach LOS		B			B			C			E	
Intersection Summary												
HCM Average Control Delay			17.8				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			61.9				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			59.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												



































HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

South Sutter
 Cumulative PP NPP MIT - AM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	780	1320	120	680	1680	10	130	970	610	30	930	1030
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)	848	1435	130	739	1826	11	141	1054	663	33	1011	1120
RTOR Reduction (vph)	0	0	45	0	0	5	0	0	357	0	0	0
Lane Group Flow (vph)	848	1435	85	739	1826	6	141	1054	306	33	1011	1120
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases			2			6			4			8
Actuated Green, G (s)	37.0	48.7	48.7	30.5	41.8	41.8	5.0	33.4	33.4	2.3	30.7	67.7
Effective Green, g (s)	37.0	50.7	50.7	30.1	43.8	43.8	5.0	33.7	33.7	2.3	31.0	68.0
Actuated g/C Ratio	0.28	0.38	0.38	0.23	0.33	0.33	0.04	0.25	0.25	0.02	0.23	0.51
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.0
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	3.0
Lane Grp Cap (vph)	956	1941	604	778	1677	522	129	1290	402	59	1187	858
v/s Ratio Prot	0.25	0.28		0.22	c0.36		c0.04	c0.21		0.01	0.20	c0.36
v/s Ratio Perm			0.05			0.00			0.19			0.34
v/c Ratio	0.89	0.74	0.14	0.95	1.09	0.01	1.09	0.82	0.76	0.56	0.85	1.30
Uniform Delay, d1	45.9	35.4	26.8	50.6	44.5	29.9	63.9	46.6	45.8	64.7	48.7	32.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.0	1.3	0.0	20.5	50.4	0.0	106.4	3.9	7.4	11.0	5.8	145.6
Delay (s)	55.9	36.7	26.9	71.1	94.9	29.9	170.3	50.6	53.2	75.8	54.5	178.0
Level of Service	E	D	C	E	F	C	F	D	D	E	D	F
Approach Delay (s)		42.9			87.8			60.6			118.8	
Approach LOS		D			F			E			F	
Intersection Summary												
HCM Average Control Delay			77.6	HCM Level of Service				E				
HCM Volume to Capacity ratio			1.25									
Actuated Cycle Length (s)			132.8	Sum of lost time (s)				16.0				
Intersection Capacity Utilization			109.9%	ICU Level of Service				H				
Analysis Period (min)			15									
c Critical Lane Group												

























HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

South Sutter
 Cumulative PP NPP MIT - AM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	310	960	40	270	1150	410	10	1220	280	340	870	640
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)	337	1043	43	293	1250	446	11	1326	304	370	946	696
RTOR Reduction (vph)	0	0	31	0	0	6	0	0	146	0	0	25
Lane Group Flow (vph)	337	1043	12	293	1250	440	11	1326	158	370	946	671
Turn Type	Prot		Perm	Prot	pm+ov		Prot	Perm		Prot	pm+ov	
Protected Phases	5	2		1	6	3	7	4		3	8	5
Permitted Phases			2			6			4			8
Actuated Green, G (s)	12.8	31.1	31.1	11.7	30.0	42.0	0.6	43.2	43.2	12.0	54.6	67.4
Effective Green, g (s)	12.8	33.1	33.1	11.7	32.0	44.0	0.6	45.2	45.2	12.0	56.6	69.4
Actuated g/C Ratio	0.11	0.28	0.28	0.10	0.27	0.37	0.01	0.38	0.38	0.10	0.48	0.59
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	2.0	4.8	4.8	2.0	4.8	2.0	2.0	4.8	4.8	2.0	4.8	2.0
Lane Grp Cap (vph)	372	1426	444	340	1379	644	17	1356	606	349	1698	985
v/s Ratio Prot	c0.10	0.21		0.09	c0.25	c0.07	0.00	c0.37		c0.11	0.27	0.07
v/s Ratio Perm			0.01			0.21			0.10			0.35
v/c Ratio	0.91	0.73	0.03	0.86	0.91	0.68	0.65	0.98	0.26	1.06	0.56	0.68
Uniform Delay, d1	52.0	38.4	30.8	52.4	41.6	31.1	58.6	35.9	25.0	53.0	21.8	16.7
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	24.3	2.3	0.0	18.9	9.2	2.4	49.2	19.3	0.4	65.0	0.6	1.6
Delay (s)	76.3	40.8	30.8	71.3	50.8	33.5	107.8	55.2	25.4	118.0	22.4	18.3
Level of Service	E	D	C	E	D	C	F	E	C	F	C	B
Approach Delay (s)		48.9			49.9			50.0			38.6	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			46.5	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			118.0	Sum of lost time (s)				12.0				
Intersection Capacity Utilization			87.8%	ICU Level of Service				E				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

South Sutter
 Cumulative PP NPP MIT - AM Peak

												
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	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	50	20	10	30	70	280	20	80	10	290	40	20
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)	54	22	11	33	76	304	22	87	11	315	43	22
RTOR Reduction (vph)	0	0	8	0	0	223	0	0	8	0	0	14
Lane Group Flow (vph)	54	22	3	33	76	81	22	87	3	315	43	8
Turn Type	Prot		Perm	Prot		Perm	Prot	custom		Prot		Perm
Protected Phases	5	2		1	6		3	7		8		4
Permitted Phases			2			6			8			4
Actuated Green, G (s)	2.0	14.8	14.8	1.2	14.0	14.0	0.5	5.3	15.0	15.0	19.8	19.8
Effective Green, g (s)	2.0	14.8	14.8	1.2	14.0	14.0	0.5	5.3	15.0	15.0	19.8	19.8
Actuated g/C Ratio	0.04	0.28	0.28	0.02	0.27	0.27	0.01	0.10	0.29	0.29	0.38	0.38
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)	68	527	448	41	499	424	17	189	454	508	705	599
v/s Ratio Prot	c0.03	0.01		0.02	0.04		0.01	c0.05		c0.18	0.02	
v/s Ratio Perm			0.00			c0.05			0.00			0.01
v/c Ratio	0.79	0.04	0.01	0.80	0.15	0.19	1.29	0.46	0.01	0.62	0.06	0.01
Uniform Delay, d1	24.9	13.6	13.5	25.4	14.6	14.8	25.9	22.2	13.3	16.2	10.3	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.6	0.0	0.0	69.0	0.1	0.2	323.2	1.8	0.0	2.4	0.0	0.0
Delay (s)	70.5	13.6	13.5	94.4	14.8	15.0	349.1	23.9	13.3	18.5	10.4	10.2
Level of Service	E	B	B	F	B	B	F	C	B	B	B	B
Approach Delay (s)		48.9			21.3			82.6			17.1	
Approach LOS		D			C			F			B	
Intersection Summary												
HCM Average Control Delay			29.5				HCM Level of Service				C	
HCM Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			52.3				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			38.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: Elverta Rd & Levee Rd

South Sutter
 Cumulative PP NPP MIT - AM Peak



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
Lane Util. Factor		0.95	1.00		0.95	1.00			1.00			1.00
Frt		1.00	0.85		1.00	0.85			0.86			0.86
Flt Protected		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (prot)		3539	1583		3539	1583			1611			1611
Flt Permitted		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (perm)		3539	1583		3539	1583			1611			1611
Volume (vph)	0	410	10	0	1050	700	0	0	210	0	0	70
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	446	11	0	1141	761	0	0	228	0	0	76
RTOR Reduction (vph)	0	0	5	0	0	334	0	0	183	0	0	33
Lane Group Flow (vph)	0	446	6	0	1141	427	0	0	45	0	0	43
Turn Type		Perm			Perm			custom			custom	
Protected Phases		2			6							
Permitted Phases		2			6			4			4	
Actuated Green, G (s)		18.7	18.7		18.7	18.7			6.6			6.6
Effective Green, g (s)		18.7	18.7		18.7	18.7			6.6			6.6
Actuated g/C Ratio		0.56	0.56		0.56	0.56			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)		1987	889		1987	889			319			319
v/s Ratio Prot		0.13			c0.32							
v/s Ratio Perm		0.00			0.27			c0.03			0.03	
v/c Ratio		0.22	0.01		0.57	0.48			0.14			0.14
Uniform Delay, d1		3.7	3.2		4.7	4.4			11.0			11.0
Progression Factor		1.00	1.00		1.00	1.00			1.00			1.00
Incremental Delay, d2		0.1	0.0		0.4	0.4			0.2			0.2
Delay (s)		3.7	3.2		5.1	4.8			11.2			11.2
Level of Service		A	A		A	A			B			B
Approach Delay (s)		3.7			5.0			11.2			11.2	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM Average Control Delay		5.5			HCM Level of Service			A				
HCM Volume to Capacity ratio		0.46										
Actuated Cycle Length (s)		33.3			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		46.7%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Sorento Rd

South Sutter
 Cumulative PP NPP MIT - AM Peak



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	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)	80	540	1680	10	180	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	587	1826	11	196	76
RTOR Reduction (vph)	0	0	0	4	0	62
Lane Group Flow (vph)	87	587	1826	7	196	14
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	4.3	52.0	43.7	43.7	13.8	13.8
Effective Green, g (s)	4.3	52.0	43.7	43.7	13.8	13.8
Actuated g/C Ratio	0.06	0.70	0.59	0.59	0.19	0.19
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)	103	2494	2096	937	331	296
v/s Ratio Prot	c0.05	0.17	c0.52		c0.11	
v/s Ratio Perm				0.00		0.01
v/c Ratio	0.84	0.24	0.87	0.01	0.59	0.05
Uniform Delay, d1	34.4	3.9	12.7	6.2	27.4	24.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	43.6	0.0	4.3	0.0	2.8	0.1
Delay (s)	78.0	3.9	17.0	6.2	30.3	24.7
Level of Service	E	A	B	A	C	C
Approach Delay (s)		13.5	16.9		28.7	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

South Sutter
Cumulative PP NPP MIT - AM Peak



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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	800	320	480	410	810	420	750	1150	100	210	1350	790
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)	870	348	522	446	880	457	815	1250	109	228	1467	859
RTOR Reduction (vph)	0	0	203	0	0	153	0	0	64	0	0	3
Lane Group Flow (vph)	870	348	319	446	880	304	815	1250	45	228	1467	856
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	27.5	40.1	40.1	20.0	32.6	32.6	25.5	50.5	50.5	12.3	37.3	64.8
Effective Green, g (s)	29.0	41.5	41.5	21.5	34.0	34.0	27.0	52.2	52.2	13.8	39.0	68.0
Actuated g/C Ratio	0.20	0.29	0.29	0.15	0.23	0.23	0.19	0.36	0.36	0.10	0.27	0.47
Clearance Time (s)	5.5	5.4	5.4	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.5
Vehicle Extension (s)	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	1.0
Lane Grp Cap (vph)	687	1455	453	509	1192	371	639	1831	570	327	1368	786
v/s Ratio Prot	c0.25	0.07		0.13	0.17		c0.24	0.25		0.07	0.29	c0.22
v/s Ratio Perm			0.20			c0.19			0.03			0.32
v/c Ratio	1.27	0.24	0.70	0.88	0.74	0.82	1.28	0.68	0.08	0.70	1.07	1.09
Uniform Delay, d1	58.0	39.7	46.2	60.4	51.4	52.6	59.0	39.4	30.6	63.6	53.0	38.5
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	131.2	0.2	6.1	15.1	3.0	14.7	135.8	1.5	0.1	5.2	46.3	59.2
Delay (s)	189.2	39.8	52.4	75.5	54.3	67.3	194.8	40.8	30.7	68.7	99.3	97.7
Level of Service	F	D	D	E	D	E	F	D	C	E	F	F
Approach Delay (s)		118.3			63.0			98.1			96.0	
Approach LOS		F			E			F			F	

Intersection Summary

HCM Average Control Delay	94.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: Elkhorn Blvd & Natomas Blvd

South Sutter
Cumulative PP NPP MIT - AM Peak

	→	↘	↙	←	↖	↗
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	0.91	1.00	0.97	0.91	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	3433	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	1770	1583
Volume (vph)	600	120	750	1510	200	490
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	652	130	815	1641	217	533
RTOR Reduction (vph)	0	96	0	0	0	387
Lane Group Flow (vph)	652	34	815	1641	217	146
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	4	
Permitted Phases		2				4
Actuated Green, G (s)	14.0	14.0	20.3	37.8	13.0	13.0
Effective Green, g (s)	15.5	15.5	19.8	39.3	12.5	12.5
Actuated g/C Ratio	0.26	0.26	0.33	0.66	0.21	0.21
Clearance Time (s)	5.5	5.5	3.5	5.5	3.5	3.5
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	1318	410	1137	3342	370	331
v/s Ratio Prot	0.13		c0.24	c0.32	c0.12	
v/s Ratio Perm		0.02				0.09
v/c Ratio	0.49	0.08	0.72	0.49	0.59	0.44
Uniform Delay, d1	18.8	16.8	17.5	5.2	21.3	20.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	1.8	0.1	1.5	0.3
Delay (s)	19.1	16.9	19.4	5.3	22.9	21.0
Level of Service	B	B	B	A	C	C
Approach Delay (s)	18.7			10.0	21.5	
Approach LOS	B			A	C	

Intersection Summary

HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project No PP AM With Mitigation















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		0.86	1.00		0.81	0.81				0.97		0.76
Frt		1.00	0.85		0.99	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		6408	1583		5995	1282				3433		3610
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		6408	1583		5995	1282				3433		3610
Volume (vph)	0	820	660	0	3020	1290	0	0	0	130	0	860
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	891	717	0	3283	1402	0	0	0	141	0	935
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	891	717	0	3432	1249	0	0	0	141	0	934
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		75.4	120.0		75.4	120.0				36.6		36.6
Effective Green, g (s)		75.4	120.0		75.4	120.0				36.6		36.6
Actuated g/C Ratio		0.63	1.00		0.63	1.00				0.31		0.31
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		4026	1583		3767	1282				1047		1101
v/s Ratio Prot		0.14			0.57					0.04		
v/s Ratio Perm			0.45			0.97						0.26
v/c Ratio		0.22	0.45		0.91	0.97				0.13		0.85
Uniform Delay, d1		9.6	0.0		19.4	0.0				30.2		39.1
Progression Factor		1.00	1.00		0.97	1.00				1.00		1.00
Incremental Delay, d2		0.1	0.8		2.1	12.0				0.1		6.2
Delay (s)		9.7	0.8		20.9	12.0				30.3		45.3
Level of Service		A	A		C	B				C		D
Approach Delay (s)		5.8			18.5		0.0				43.4	
Approach LOS		A			B		A				D	

Intersection Summary

HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project No PP AM With Mitigation

												
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		0.81	0.81		0.86	1.00	0.94		1.00			
Frt		1.00	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		6035	1282		6408	1583	4990		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		6035	1282		6408	1583	4990		1583			
Volume (vph)	0	710	240	0	2520	70	1790	0	1470	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)	0	772	261	0	2739	76	1946	0	1598	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	772	261	0	2739	76	1946	0	1598	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		65.0	120.0		65.0	120.0	47.0		120.0			
Effective Green, g (s)		65.0	120.0		65.0	120.0	47.0		120.0			
Actuated g/C Ratio		0.54	1.00		0.54	1.00	0.39		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		3269	1282		3471	1583	1954		1583			
v/s Ratio Prot		0.13			0.43		0.39					
v/s Ratio Perm			0.20			0.05			c1.01			
v/c Ratio		0.24	0.20		0.79	0.05	1.00		1.01			
Uniform Delay, d1		14.5	0.0		22.0	0.0	36.4		60.0			
Progression Factor		0.35	1.00		0.48	1.00	1.00		1.00			
Incremental Delay, d2		0.2	0.4		1.6	0.0	19.3		25.0			
Delay (s)		5.2	0.4		12.1	0.0	55.7		85.0			
Level of Service		A	A		B	A	E		F			
Approach Delay (s)		4.0			11.8			68.9			0.0	
Approach LOS		A			B			E			A	
Intersection Summary												
HCM Average Control Delay			38.1				HCM Level of Service		D			
HCM Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			77.2%				ICU Level of Service		D			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
2: Sankey Rd & Hwy 99

South Sutter
Cumulative PP NPP MIT - PM Peak

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
Lane Util. Factor	1.00	1.00		0.94	1.00	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1723		4990	1863	1583	1770	4150	1583	3433	4803	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1723		4990	1863	1583	1770	4150	1583	3433	4803	1583
Volume (vph)	10	10	10	1160	10	380	10	2370	810	310	1280	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	10	10	1196	10	392	10	2443	835	320	1320	10
RTOR Reduction (vph)	0	9	0	0	0	20	0	0	0	0	0	4
Lane Group Flow (vph)	10	11	0	1196	10	372	10	2443	835	320	1320	6
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	25%	2%	2%	8%	2%
Turn Type	Prot			Prot		pm+ov	Prot		Free	Prot		Perm
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases						8			Free			6
Actuated Green, G (s)	1.5	8.1		32.2	38.8	51.9	1.5	85.9	155.3	13.1	97.5	97.5
Effective Green, g (s)	1.5	8.1		32.2	38.8	51.9	1.5	85.9	155.3	13.1	97.5	97.5
Actuated g/C Ratio	0.01	0.05		0.21	0.25	0.33	0.01	0.55	1.00	0.08	0.63	0.63
Clearance Time (s)	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
Lane Grp Cap (vph)	17	90		1035	465	570	17	2295	1583	290	3015	994
v/s Ratio Prot	0.01	0.01		c0.24	0.01	c0.06	0.01	c0.59		c0.09	0.27	
v/s Ratio Perm						0.18			0.53			0.00
v/c Ratio	0.59	0.12		1.16	0.02	0.65	0.59	1.06	0.53	1.10	0.44	0.01
Uniform Delay, d1	76.6	70.2		61.6	43.9	44.0	76.6	34.7	0.0	71.1	14.8	10.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.8	0.6		81.1	0.0	2.7	42.8	38.7	1.3	83.5	0.1	0.0
Delay (s)	119.4	70.8		142.7	44.0	46.7	119.4	73.4	1.3	154.6	14.9	10.8
Level of Service	F	E		F	D	D	F	E	A	F	B	B
Approach Delay (s)		87.0			118.5			55.2			42.0	
Approach LOS		F			F			E			D	





























Intersection Summary

HCM Average Control Delay	67.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	155.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Riego Rd & Pleasant Grove Blvd.

South Sutter
Cumulative PP NPP MIT - PM Peak

												
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	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1622		1770	1617	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	3433	1622		1770	1617	
Volume (vph)	140	1290	690	60	890	150	570	10	60	100	10	70
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	144	1330	711	62	918	155	588	10	62	103	10	72
RTOR Reduction (vph)	0	0	494	0	0	113	0	47	0	0	60	0
Lane Group Flow (vph)	144	1330	217	62	918	42	588	25	0	103	22	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	5.2	19.9	19.9	3.1	17.8	17.8	15.6	16.1		10.2	10.7	
Effective Green, g (s)	5.2	19.9	19.9	3.1	17.8	17.8	15.6	16.1		10.2	10.7	
Actuated g/C Ratio	0.08	0.30	0.30	0.05	0.27	0.27	0.24	0.25		0.16	0.16	
Clearance Time (s)	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	
Lane Grp Cap (vph)	141	1550	482	84	1386	432	820	400		276	265	
v/s Ratio Prot	c0.08	c0.26		0.04	0.18		c0.17	0.02		0.06	c0.01	
v/s Ratio Perm			0.14			0.03						
v/c Ratio	1.02	0.86	0.45	0.74	0.66	0.10	0.72	0.06		0.37	0.08	
Uniform Delay, d1	30.0	21.4	18.3	30.7	21.1	17.7	22.8	18.8		24.7	23.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	81.5	5.0	0.7	28.3	1.2	0.1	3.0	0.1		0.9	0.1	
Delay (s)	111.6	26.3	19.0	59.0	22.3	17.8	25.8	18.9		25.5	23.3	
Level of Service	F	C	B	E	C	B	C	B		C	C	
Approach Delay (s)		29.5			23.7			25.1			24.5	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			27.0				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			65.3				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			61.2%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

































HCM Signalized Intersection Capacity Analysis
10: Baseline Rd & Locust Rd

South Sutter
Cumulative PP NPP MIT - PM Peak

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	0.95	1.00	1.00	0.95	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	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1818	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1818	
Volume (vph)	10	1340	100	40	1020	70	70	10	190	590	50	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	1381	103	41	1052	72	72	10	196	608	52	10
RTOR Reduction (vph)	0	0	35	0	0	32	0	0	77	0	5	0
Lane Group Flow (vph)	10	1381	68	41	1052	40	72	10	119	608	57	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			
Actuated Green, G (s)	1.5	59.5	59.5	4.0	62.0	62.0	8.7	16.0	16.0	50.1	57.4	
Effective Green, g (s)	1.5	59.5	59.5	4.0	62.0	62.0	8.7	16.0	16.0	50.1	57.4	
Actuated g/C Ratio	0.01	0.41	0.41	0.03	0.43	0.43	0.06	0.11	0.11	0.34	0.39	
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)	18	1446	647	49	1507	674	106	205	174	609	717	
v/s Ratio Prot	0.01	c0.39		c0.02	0.30		0.04	0.01		c0.34	0.03	
v/s Ratio Perm			0.04			0.03			c0.08			
v/c Ratio	0.56	0.96	0.10	0.84	0.70	0.06	0.68	0.05	0.69	1.00	0.08	
Uniform Delay, d1	71.7	41.8	26.6	70.5	34.2	24.6	67.1	58.0	62.4	47.7	27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	32.3	14.3	0.1	70.1	1.4	0.0	15.9	0.1	10.7	35.8	0.0	
Delay (s)	104.0	56.0	26.7	140.6	35.6	24.7	83.0	58.1	73.1	83.5	27.6	
Level of Service	F	E	C	F	D	C	F	E	E	F	C	
Approach Delay (s)		54.3			38.6			75.1			78.3	
Approach LOS		D			D			E			E	
Intersection Summary												
HCM Average Control Delay			55.3				HCM Level of Service			E		
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			145.6				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			91.5%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												


































HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

South Sutter
Cumulative PP NPP MIT - PM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	1080	1730	170	730	1430	10	160	1020	740	10	1000	930
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1113	1784	175	753	1474	10	165	1052	763	10	1031	959
RTOR Reduction (vph)	0	0	42	0	0	5	0	0	330	0	0	1
Lane Group Flow (vph)	1113	1784	133	753	1474	5	165	1052	433	10	1031	958
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases			2			6			4			8
Actuated Green, G (s)	47.0	54.0	54.0	32.5	39.1	39.1	7.0	38.9	38.9	1.6	33.5	80.5
Effective Green, g (s)	47.0	56.0	56.0	32.1	41.1	41.1	7.0	39.2	39.2	1.6	33.8	80.8
Actuated g/C Ratio	0.32	0.39	0.39	0.22	0.28	0.28	0.05	0.27	0.27	0.01	0.23	0.56
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.0
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	3.0
Lane Grp Cap (vph)	1114	1965	612	761	1442	449	166	1376	428	38	1186	926
v/s Ratio Prot	0.32	0.35		0.22	c0.29		c0.05	0.21		0.00	0.20	c0.34
v/s Ratio Perm			0.08			0.00			c0.27			0.27
v/c Ratio	1.00	0.91	0.22	0.99	1.02	0.01	0.99	0.76	1.01	0.26	0.87	1.03
Uniform Delay, d1	48.9	42.0	29.8	56.2	51.9	37.3	68.9	48.6	52.9	71.1	53.4	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.5	6.4	0.1	29.6	29.5	0.0	67.7	2.3	46.6	3.7	6.8	38.9
Delay (s)	75.5	48.4	29.8	85.8	81.4	37.3	136.7	50.9	99.5	74.7	60.2	70.9
Level of Service	E	D	C	F	F	D	F	D	F	E	E	E
Approach Delay (s)		57.2			82.7			76.8			65.4	
Approach LOS		E			F			E			E	
Intersection Summary												
HCM Average Control Delay			69.3			HCM Level of Service		E				
HCM Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			144.9			Sum of lost time (s)		8.0				
Intersection Capacity Utilization			99.8%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

























HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

South Sutter
 Cumulative PP NPP MIT - PM Peak

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	610	1370	70	250	1030	510	30	1080	280	450	1240	460
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	629	1412	72	258	1062	526	31	1113	289	464	1278	474
RTOR Reduction (vph)	0	0	44	0	0	4	0	0	150	0	0	8
Lane Group Flow (vph)	629	1412	28	258	1062	522	31	1113	139	464	1278	466
Turn Type	Prot		Perm	Prot	pm+ov		Prot	Perm	Prot	pm+ov		
Protected Phases	5	2		1	6	3	7	4		3	8	5
Permitted Phases			2			6			4			8
Actuated Green, G (s)	22.0	40.3	40.3	11.6	29.9	46.9	1.8	37.6	37.6	17.0	52.8	74.8
Effective Green, g (s)	22.0	42.3	42.3	11.6	31.9	48.9	1.8	39.6	39.6	17.0	54.8	76.8
Actuated g/C Ratio	0.17	0.33	0.33	0.09	0.25	0.39	0.01	0.31	0.31	0.13	0.43	0.61
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	2.0	4.8	4.8	2.0	4.8	2.0	2.0	4.8	4.8	2.0	4.8	2.0
Lane Grp Cap (vph)	597	1700	529	315	1282	662	49	1108	496	461	1533	1011
v/s Ratio Prot	c0.18	c0.28		0.08	0.21	c0.11	0.01	c0.31		c0.14	0.36	0.08
v/s Ratio Perm			0.02			0.22			0.09			0.21
v/c Ratio	1.05	0.83	0.05	0.82	0.83	0.79	0.63	1.00	0.28	1.01	0.83	0.46
Uniform Delay, d1	52.2	38.8	28.5	56.4	44.7	34.2	62.0	43.5	32.7	54.8	31.8	13.6
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	51.7	4.0	0.1	14.5	5.1	5.7	17.9	28.1	0.6	43.5	4.5	0.1
Delay (s)	104.0	42.8	28.6	70.9	49.8	40.0	79.9	71.6	33.3	98.3	36.3	13.7
Level of Service	F	D	C	E	D	D	E	E	C	F	D	B
Approach Delay (s)		60.5			49.9			64.0			44.4	
Approach LOS		E			D			E			D	
Intersection Summary												
HCM Average Control Delay			53.9	HCM Level of Service				D				
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			126.5	Sum of lost time (s)				8.0				
Intersection Capacity Utilization			93.3%	ICU Level of Service				F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

South Sutter
 Cumulative PP NPP MIT - PM Peak

												
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	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	10	180	90	10	80	540	10	30	20	470	140	90
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	186	93	10	82	557	10	31	21	485	144	93
RTOR Reduction (vph)	0	0	72	0	0	433	0	0	13	0	0	52
Lane Group Flow (vph)	10	186	21	10	82	124	10	31	8	485	144	41
Turn Type	Prot		Perm	Prot		Perm	Prot	custom		Prot		Perm
Protected Phases	5	2		1	6		3	7		8		4
Permitted Phases			2			6			8			4
Actuated Green, G (s)	0.4	11.2	11.2	0.4	11.2	11.2	0.4	3.2	19.7	19.7	22.5	22.5
Effective Green, g (s)	0.4	11.2	11.2	0.4	11.2	11.2	0.4	3.2	19.7	19.7	22.5	22.5
Actuated g/C Ratio	0.01	0.22	0.22	0.01	0.22	0.22	0.01	0.06	0.39	0.39	0.45	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	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)	14	413	351	14	413	351	14	118	618	690	830	705
v/s Ratio Prot	c0.01	c0.10		0.01	0.04		0.01	c0.02		c0.27	c0.08	
v/s Ratio Perm			0.01			0.08			0.01			0.03
v/c Ratio	0.71	0.45	0.06	0.71	0.20	0.35	0.71	0.26	0.01	0.70	0.17	0.06
Uniform Delay, d1	25.0	17.0	15.5	25.0	16.0	16.6	25.0	22.5	9.4	12.9	8.4	8.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	100.1	0.8	0.1	100.1	0.2	0.6	100.1	1.2	0.0	3.3	0.1	0.0
Delay (s)	125.1	17.8	15.6	125.1	16.2	17.2	125.1	23.7	9.4	16.2	8.5	8.0
Level of Service	F	B	B	F	B	B	F	C	A	B	A	A
Approach Delay (s)		20.8			18.7			35.2			13.6	
Approach LOS		C			B			D			B	
Intersection Summary												
HCM Average Control Delay			17.5				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			50.5				Sum of lost time (s)		20.0			
Intersection Capacity Utilization			50.1%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
16: Elverta Rd & Levee Rd

South Sutter
Cumulative PP NPP MIT - PM Peak



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		0.95	1.00		0.95	1.00			1.00			1.00
Frt		1.00	0.85		1.00	0.85			0.86			0.86
Flt Protected		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (prot)		3539	1583		3539	1583			1611			1611
Flt Permitted		1.00	1.00		1.00	1.00			1.00			1.00
Satd. Flow (perm)		3539	1583		3539	1583			1611			1611
Volume (vph)	0	1120	40	0	450	370	0	0	660	0	0	130
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1155	41	0	464	381	0	0	680	0	0	134
RTOR Reduction (vph)	0	0	25	0	0	235	0	0	10	0	0	72
Lane Group Flow (vph)	0	1155	16	0	464	146	0	0	670	0	0	62
Turn Type		Perm			Perm			custom			custom	
Protected Phases		2			6							
Permitted Phases		2			6			4			4	
Actuated Green, G (s)		19.6	19.6		19.6	19.6			23.7			23.7
Effective Green, g (s)		19.6	19.6		19.6	19.6			23.7			23.7
Actuated g/C Ratio		0.38	0.38		0.38	0.38			0.46			0.46
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)		1352	605		1352	605			744			744
v/s Ratio Prot		c0.33			0.13							
v/s Ratio Perm			0.01			0.09			c0.42			0.04
v/c Ratio		0.85	0.03		0.34	0.24			0.90			0.08
Uniform Delay, d1		14.5	9.9		11.3	10.8			12.7			7.7
Progression Factor		1.00	1.00		1.00	1.00			1.00			1.00
Incremental Delay, d2		5.5	0.0		0.2	0.2			14.1			0.0
Delay (s)		20.0	9.9		11.4	11.0			26.8			7.8
Level of Service		C	A		B	B			C			A
Approach Delay (s)		19.7			11.2			26.8			7.8	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM Average Control Delay		18.3			HCM Level of Service			B				
HCM Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		51.3			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		78.5%			ICU Level of Service			D				
Analysis Period (min)		15										
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Pleasant Grove Blvd.

South Sutter
 Cumulative PP NPP MIT - PM Peak



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	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)	130	1650	810	60	310	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	1701	835	62	320	10
RTOR Reduction (vph)	0	0	0	36	0	7
Lane Group Flow (vph)	134	1701	835	26	320	3
Turn Type	Prot		Perm		Perm	
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	5.2	32.1	22.9	22.9	14.7	14.7
Effective Green, g (s)	5.2	32.1	22.9	22.9	14.7	14.7
Actuated g/C Ratio	0.09	0.59	0.42	0.42	0.27	0.27
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)	168	2073	1479	662	475	425
v/s Ratio Prot	0.08	c0.48	0.24		c0.18	
v/s Ratio Perm				0.02		0.00
v/c Ratio	0.80	0.82	0.56	0.04	0.67	0.01
Uniform Delay, d1	24.3	9.1	12.2	9.4	17.9	14.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.5	2.7	0.5	0.0	3.8	0.0
Delay (s)	46.8	11.8	12.6	9.5	21.7	14.7
Level of Service	D	B	B	A	C	B
Approach Delay (s)		14.3	12.4		21.5	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: Elverta Rd & Watt Ave

South Sutter
Cumulative PP NPP MIT - PM Peak



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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	810	750	720	280	380	230	730	1230	380	350	1120	760
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	835	773	742	289	392	237	753	1268	392	361	1155	784
RTOR Reduction (vph)	0	0	251	0	0	186	0	0	148	0	0	39
Lane Group Flow (vph)	835	773	491	289	392	51	753	1268	244	361	1155	745
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	31.6	48.7	48.7	11.7	28.8	28.8	28.6	42.9	42.9	16.1	30.4	62.0
Effective Green, g (s)	33.1	50.1	50.1	13.2	30.2	30.2	30.1	44.6	44.6	17.6	32.1	65.2
Actuated g/C Ratio	0.23	0.35	0.35	0.09	0.21	0.21	0.21	0.32	0.32	0.12	0.23	0.46
Clearance Time (s)	5.5	5.4	5.4	5.5	5.4	5.4	5.5	5.7	5.7	5.5	5.7	5.5
Vehicle Extension (s)	1.0	5.0	5.0	1.0	5.0	5.0	1.0	5.4	5.4	1.0	5.4	1.0
Lane Grp Cap (vph)	803	1800	560	320	1085	338	730	1603	499	427	1154	774
v/s Ratio Prot	c0.24	0.15		0.08	0.08		c0.22	0.25		0.11	0.23	c0.22
v/s Ratio Perm			c0.31			0.03			0.15			0.25
v/c Ratio	1.04	0.43	0.88	0.90	0.36	0.15	1.03	0.79	0.49	0.85	1.00	0.96
Uniform Delay, d1	54.2	34.8	42.8	63.5	47.4	45.2	55.7	44.2	39.2	60.6	54.7	37.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.6	0.3	15.4	26.7	0.4	0.4	41.7	3.2	1.8	13.7	26.7	23.2
Delay (s)	96.8	35.2	58.2	90.2	47.9	45.6	97.4	47.4	41.0	74.3	81.4	60.2
Level of Service	F	D	E	F	D	D	F	D	D	E	F	E
Approach Delay (s)		64.3			60.6			62.0			73.0	
Approach LOS		E			E			E			E	

Intersection Summary

HCM Average Control Delay	65.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	141.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

South Sutter
 Cumulative PP NPP MIT - PM Peak

	→	↘	↙	←	↖	↗
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	0.91	1.00	0.97	0.91	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	3433	5085	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	5085	1583	3433	5085	1770	1583
Volume (vph)	1610	160	600	560	100	910
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1660	165	619	577	103	938
RTOR Reduction (vph)	0	107	0	0	0	257
Lane Group Flow (vph)	1660	58	619	577	103	681
Turn Type		Perm	Prot			Perm
Protected Phases	2		1	6	4	
Permitted Phases		2				4
Actuated Green, G (s)	31.0	31.0	18.6	53.1	37.9	37.9
Effective Green, g (s)	32.5	32.5	18.1	54.6	37.4	37.4
Actuated g/C Ratio	0.32	0.32	0.18	0.55	0.37	0.37
Clearance Time (s)	5.5	5.5	3.5	5.5	3.5	3.5
Vehicle Extension (s)	3.0	3.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	1653	514	621	2776	662	592
v/s Ratio Prot	c0.33		c0.18	0.11	0.06	
v/s Ratio Perm		0.04				c0.43
v/c Ratio	1.00	0.11	1.00	0.21	0.16	1.15
Uniform Delay, d1	33.8	23.6	40.9	11.6	20.8	31.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.2	0.1	35.0	0.0	0.0	86.2
Delay (s)	56.9	23.7	75.9	11.7	20.8	117.5
Level of Service	E	C	E	B	C	F
Approach Delay (s)	53.9			44.9	107.9	
Approach LOS	D			D	F	

Intersection Summary

HCM Average Control Delay	65.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project No PP PM with Mitigation





















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		0.86	1.00		0.81	0.81				0.97		0.76
Frt		1.00	0.85		0.96	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		6408	1583		5809	1282				3433		3610
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		6408	1583		5809	1282				3433		3610
Volume (vph)	0	2360	1840	0	2050	1800	0	0	0	110	0	490
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2433	1897	0	2113	1856	0	0	0	113	0	505
RTOR Reduction (vph)	0	0	0	0	54	0	0	0	0	0	0	5
Lane Group Flow (vph)	0	2433	1897	0	2764	1151	0	0	0	113	0	500
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		50.0	75.0		50.0	75.0				17.0		17.0
Effective Green, g (s)		50.0	75.0		50.0	75.0				17.0		17.0
Actuated g/C Ratio		0.67	1.00		0.67	1.00				0.23		0.23
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		4272	1583		3873	1282				778		818
v/s Ratio Prot		0.38			0.48					0.03		
v/s Ratio Perm			c1.20			0.90						0.14
v/c Ratio		0.57	1.20		0.71	0.90				0.15		0.61
Uniform Delay, d1		6.7	37.5		7.9	0.0				23.2		26.0
Progression Factor		0.39	1.00		1.37	1.00				1.00		1.00
Incremental Delay, d2		0.2	91.9		0.7	6.9				0.1		1.4
Delay (s)		2.9	129.4		11.6	6.9				23.3		27.4
Level of Service		A	F		B	A				C		C
Approach Delay (s)		58.3			10.2			0.0			26.6	
Approach LOS		E			B			A			C	

Intersection Summary

HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

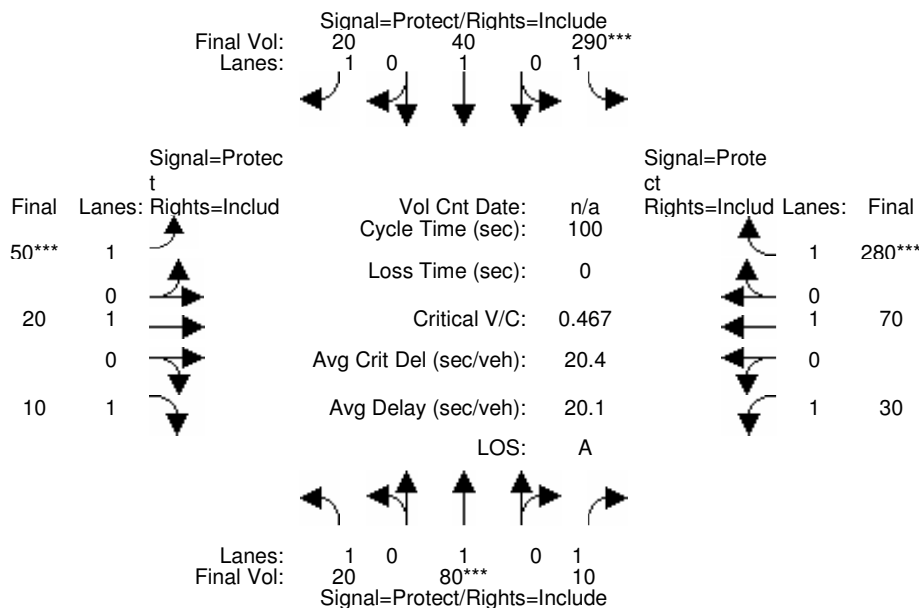
HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project No PP PM with Mitigation

												
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		0.81	0.81		0.86	1.00	0.94		1.00			
Frt		0.99	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		5993	1282		6408	1583	4990		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		5993	1282		6408	1583	4990		1583			
Volume (vph)	0	1660	810	0	2770	320	1080	0	1810	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1711	835	0	2856	330	1113	0	1866	0	0	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1788	751	0	2856	330	1113	0	1866	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		43.9	75.0		43.9	75.0	23.1		75.0			
Effective Green, g (s)		43.9	75.0		43.9	75.0	23.1		75.0			
Actuated g/C Ratio		0.59	1.00		0.59	1.00	0.31		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		3508	1282		3751	1583	1537		1583			
v/s Ratio Prot		0.30			0.45		0.22					
v/s Ratio Perm			0.59			0.21			c1.18			
v/c Ratio		0.51	0.59		0.76	0.21	0.72		1.18			
Uniform Delay, d1		9.2	0.0		11.6	0.0	23.1		37.5			
Progression Factor		0.31	1.00		1.11	1.00	1.00		1.00			
Incremental Delay, d2		0.4	1.7		0.7	0.1	1.7		87.4			
Delay (s)		3.3	1.7		13.6	0.1	24.8		124.9			
Level of Service		A	A		B	A	C		F			
Approach Delay (s)		2.8			12.2			87.5			0.0	
Approach LOS		A			B			F			A	
Intersection Summary												
HCM Average Control Delay			35.2				HCM Level of Service		D			
HCM Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			75.0				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			67.3%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

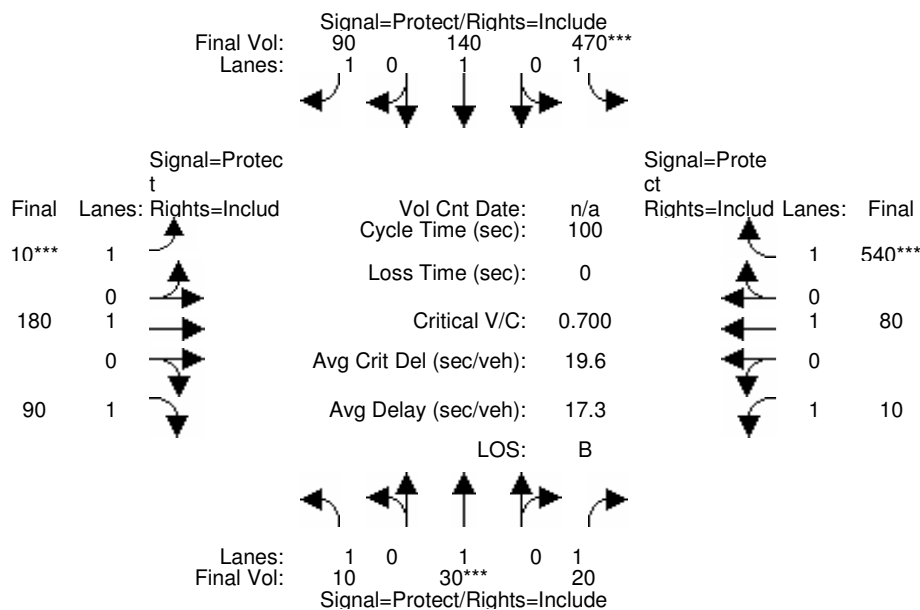
Intersection #114: MIT-Elverta Road / Powerline Road



Street Name:	Powerline Road						Elverta Road						
Approach:	North Bound			South Bound			East Bound			West Bound			
Movement:	L	T	R	L	T	R	L	T	R	L	T	R	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0	
Volume Module:	Base Vol:	20	80	10	290	40	20	50	20	10	30	70	280
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Initial Bse:	20	80	10	290	40	20	50	20	10	30	70	280	
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0	
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0	
Initial Fut:	20	80	10	290	40	20	50	20	10	30	70	280	
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PHF Volume:	20	80	10	290	40	20	50	20	10	30	70	280	
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0	
Reduced Vol:	20	80	10	290	40	20	50	20	10	30	70	280	
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
FinalVolume:	20	80	10	290	40	20	50	20	10	30	70	280	
Saturation Flow Module:	Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Final Sat.:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	
Capacity Analysis Module:	Vol/Sat:	0.01	0.05	0.01	0.19	0.03	0.01	0.03	0.01	0.01	0.02	0.05	0.19
Crit Volume:	80			290			50				280		
Crit Moves:	****			****			****				****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PM

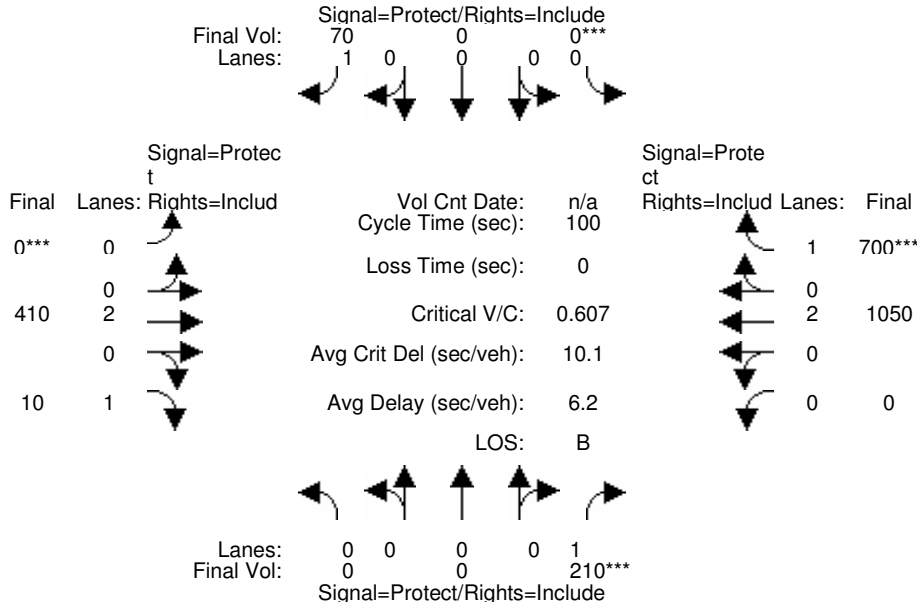
Intersection #114: MIT-Elverta Road / Powerline Road



Street Name:	Powerline Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	30	20	470	140	90	10	180	90	10	80	540
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	30	20	470	140	90	10	180	90	10	80	540
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	30	20	470	140	90	10	180	90	10	80	540
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	30	20	470	140	90	10	180	90	10	80	540
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	30	20	470	140	90	10	180	90	10	80	540
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	30	20	470	140	90	10	180	90	10	80	540
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Capacity Analysis Module:												
Vol/Sat:	0.01	0.02	0.01	0.31	0.09	0.06	0.01	0.12	0.06	0.01	0.05	0.36
Crit Volume:		30		470			10					540
Crit Moves:	****			****			****					****

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

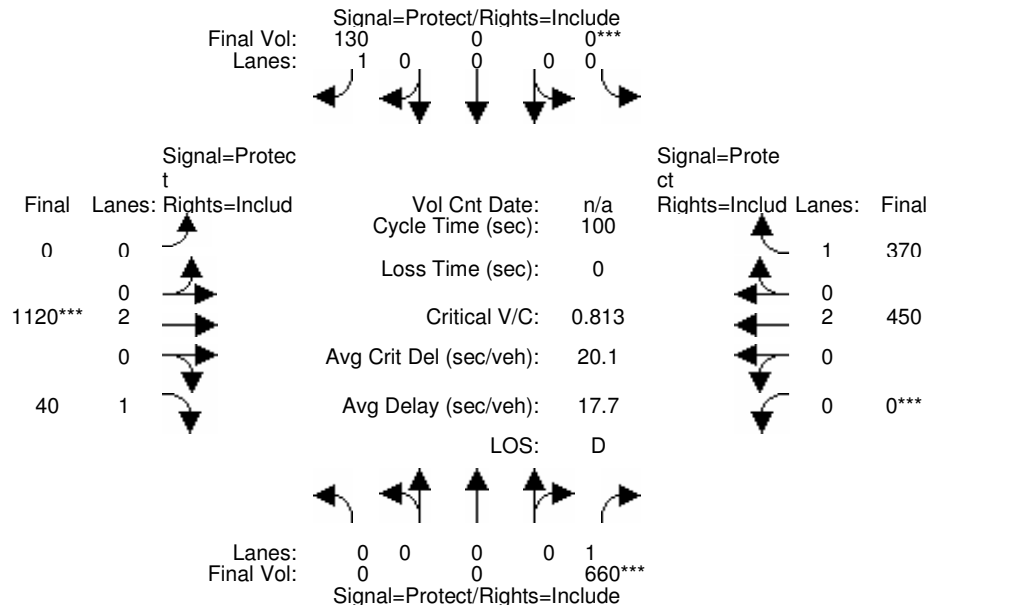
Intersection #116: MIT-Elverta Road / East Levee Road



Street Name:	East Levee Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	210	0	0	70	0	410	10	0	1050	700
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	210	0	0	70	0	410	10	0	1050	700
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	210	0	0	70	0	410	10	0	1050	700
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	210	0	0	70	0	410	10	0	1050	700
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	210	0	0	70	0	410	10	0	1050	700
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	0	0	210	0	0	70	0	410	10	0	1050	700
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	0.00	2.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	1500	0	0	1500	0	3000	1500	0	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.14	0.00	0.00	0.05	0.00	0.14	0.01	0.00	0.35	0.47
Crit Volume:			210			0			0			700
Crit Moves:			***			***			***			***

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PM

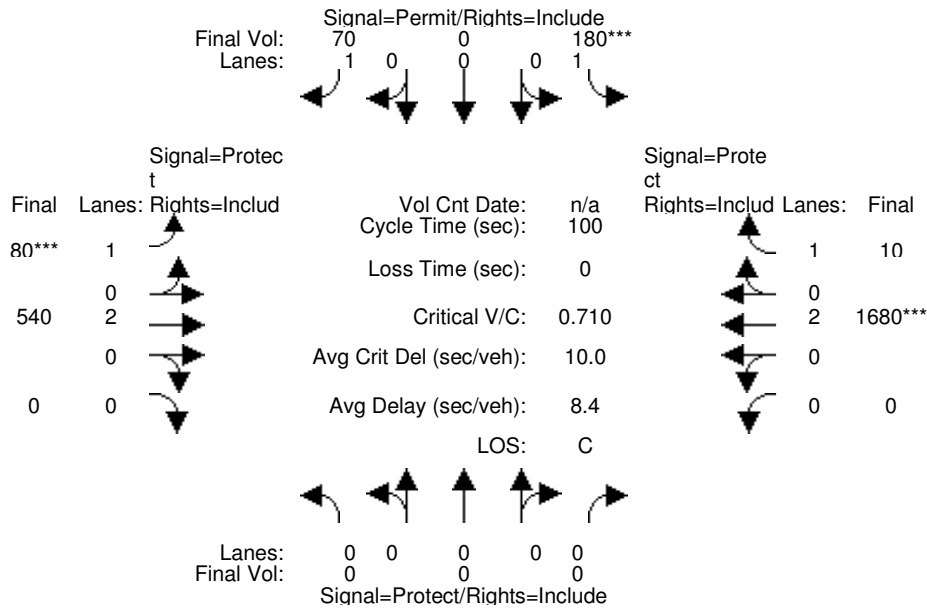
Intersection #116: MIT-Elverta Road / East Levee Road



Street Name:	East Levee Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	660	0	0	130	0	1120	40	0	450	370
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	660	0	0	130	0	1120	40	0	450	370
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	660	0	0	130	0	1120	40	0	450	370
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	660	0	0	130	0	1120	40	0	450	370
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	660	0	0	130	0	1120	40	0	450	370
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Volume:	0	0	660	0	0	130	0	1120	40	0	450	370
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	1.00	0.00	0.00	1.00	0.00	2.00	1.00	0.00	2.00	1.00
Final Sat.:	0	0	1500	0	0	1500	0	3000	1500	0	3000	1500
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.44	0.00	0.00	0.09	0.00	0.37	0.03	0.00	0.15	0.25
Crit Volume:			660			0			560			0
Crit Moves:			***			***			***			***

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project AM

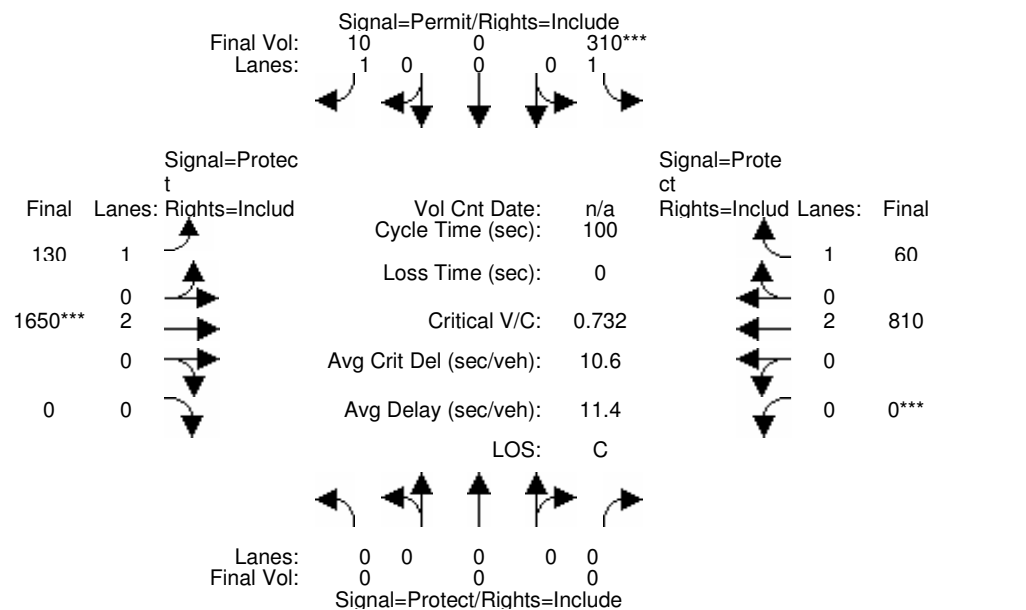
Intersection #117: MIT-Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	180	0	70	80	540	0	0	1680	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	180	0	70	80	540	0	0	1680	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	180	0	70	80	540	0	0	1680	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	180	0	70	80	540	0	0	1680	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	180	0	70	80	540	0	0	1680	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	180	0	70	80	540	0	0	1680	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.12	0.00	0.05	0.05	0.17	0.00	0.00	0.54	0.01
Crit Volume:	0			180			80			840		
Crit Moves:				***			***			***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PM

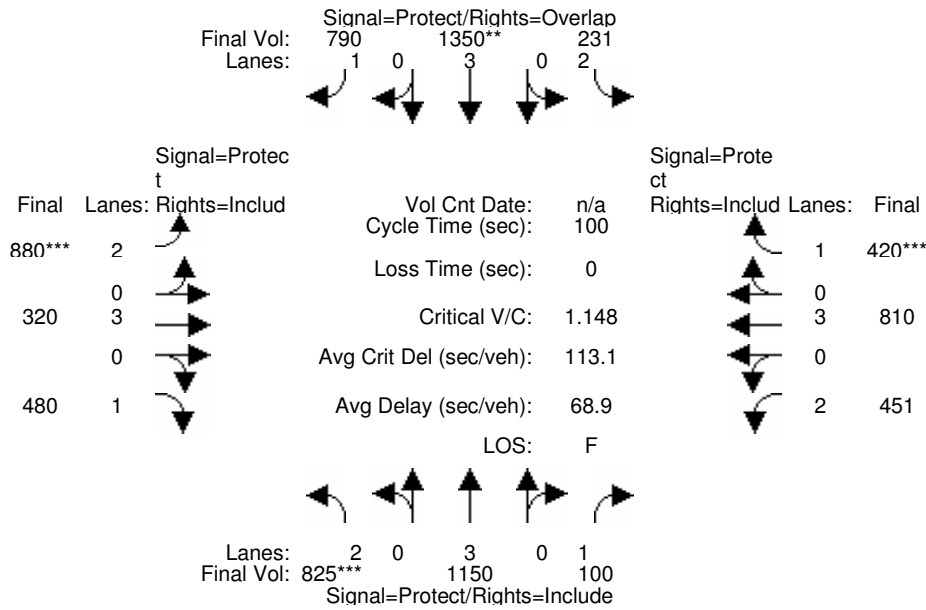
Intersection #117: MIT-Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	310	0	10	130	1650	0	0	810	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	310	0	10	130	1650	0	0	810	60
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	310	0	10	130	1650	0	0	810	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	310	0	10	130	1650	0	0	810	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	310	0	10	130	1650	0	0	810	60
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	310	0	10	130	1650	0	0	810	60
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.20	0.00	0.01	0.08	0.53	0.00	0.00	0.26	0.04
Crit Volume:	0			310			825			0		
Crit Moves:				***			***			***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project AM

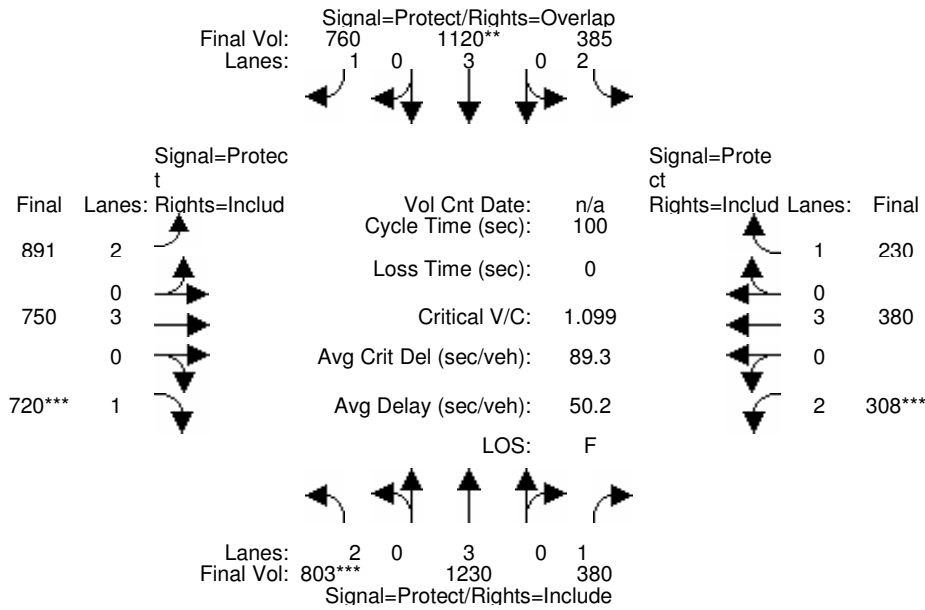
Intersection #120: MIT-Elverta Road / Watt avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	750	1150	100	210	1350	790	800	320	480	410	810	420
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	750	1150	100	210	1350	790	800	320	480	410	810	420
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	750	1150	100	210	1350	790	800	320	480	410	810	420
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	750	1150	100	210	1350	790	800	320	480	410	810	420
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	750	1150	100	210	1350	790	800	320	480	410	810	420
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	825	1150	100	231	1350	790	880	320	480	451	810	420
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.28	0.26	0.07	0.08	0.30	0.53	0.29	0.07	0.32	0.15	0.18	0.28
Crit Volume:	413			450			440			420		
Crit Moves:	****			****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PM

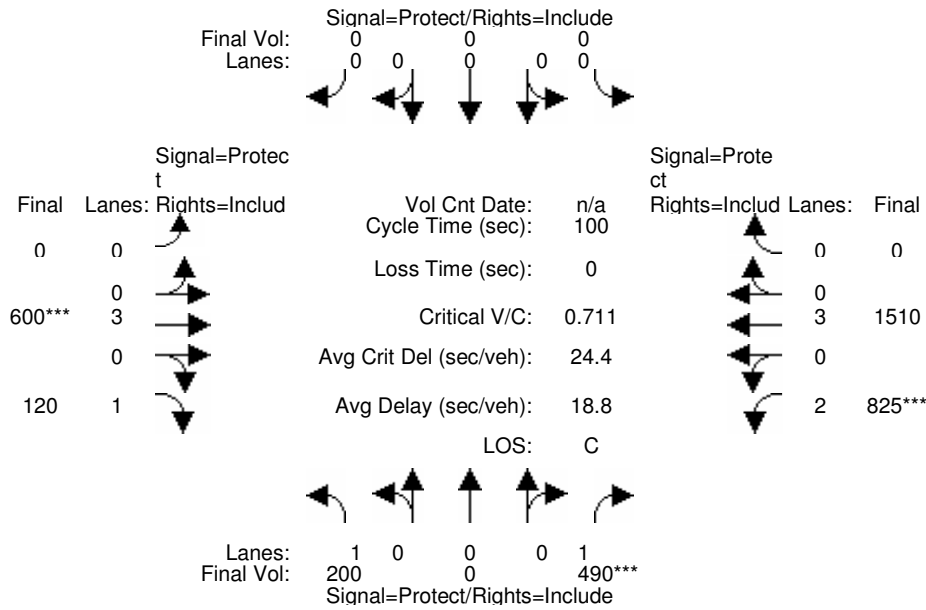
Intersection #120: MIT-Elverta Road / Watt avenue



Street Name:	Watt Avenue						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	730	1230	380	350	1120	760	810	750	720	280	380	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	730	1230	380	350	1120	760	810	750	720	280	380	230
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	730	1230	380	350	1120	760	810	750	720	280	380	230
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	730	1230	380	350	1120	760	810	750	720	280	380	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	730	1230	380	350	1120	760	810	750	720	280	380	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.00	1.00
FinalVolume:	803	1230	380	385	1120	760	891	750	720	308	380	230
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00	2.00	3.00	1.00
Final Sat.:	3000	4500	1500	3000	4500	1500	3000	4500	1500	3000	4500	1500
Capacity Analysis Module:												
Vol/Sat:	0.27	0.27	0.25	0.13	0.25	0.51	0.30	0.17	0.48	0.10	0.08	0.15
Crit Volume:	402				373				720	154		
Crit Moves:	****				****				****	****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project AM

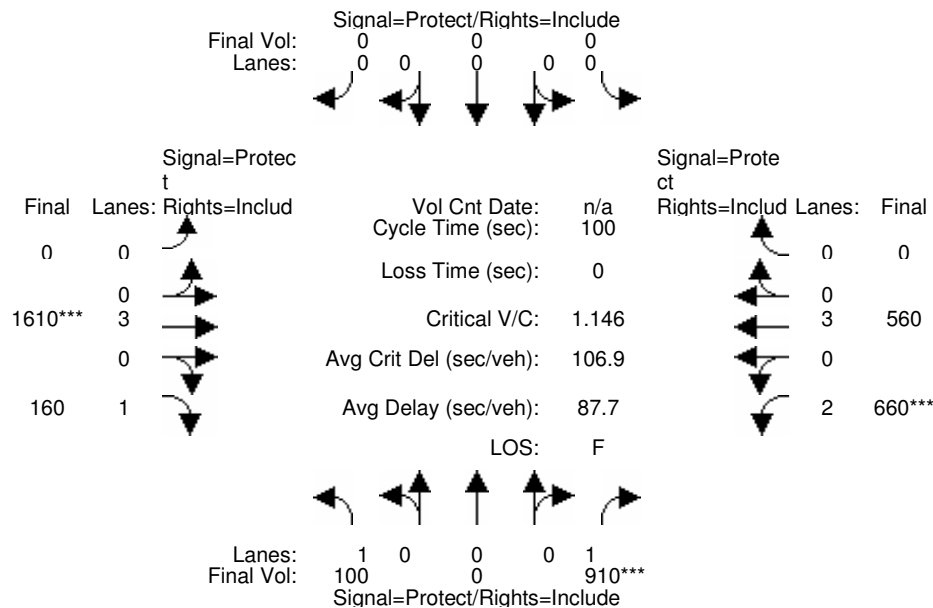
Intersection #123: MIT-Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard					Elkhorn Boulevard					
	North Bound			South Bound		East Bound			West Bound		
Approach:	L	T	R	L	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0
Volume Module:											
Base Vol:	200	0	490	0	0	0	600	120	750	1510	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	200	0	490	0	0	0	600	120	750	1510	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	200	0	490	0	0	0	600	120	750	1510	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	200	0	490	0	0	0	600	120	750	1510	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	200	0	490	0	0	0	600	120	750	1510	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	200	0	490	0	0	0	600	120	825	1510	0
Saturation Flow Module:											
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	3.00	1.00	2.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	4650	1550	3100	4650	0
Capacity Analysis Module:											
Vol/Sat:	0.13	0.00	0.32	0.00	0.00	0.00	0.13	0.08	0.27	0.32	0.00
Crit Volume:			490	0			200		413		
Crit Moves:			***				***		***		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PM

Intersection #123: MIT-Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	100	0	910	0	0	0	0	1610	160	600	560	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	100	0	910	0	0	0	0	1610	160	600	560	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	100	0	910	0	0	0	0	1610	160	600	560	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	100	0	910	0	0	0	0	1610	160	600	560	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	100	0	910	0	0	0	0	1610	160	600	560	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	100	0	910	0	0	0	0	1610	160	660	560	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	2.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	3100	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.59	0.00	0.00	0.00	0.00	0.35	0.10	0.21	0.12	0.00
Crit Volume:			910	0				537		330		
Crit Moves:			***					***		***		

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/Mit
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	4
Free-flow speed on freeway	65.0 mph
Volume on freeway	4823 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	700 vph
Length of first accel/decel lane	200 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4823	700	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1311	190	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5898	780	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.170 Using Equation 4
FM
 $v = v(P) = 1002$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6678	9400	No
v v	2448 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		Yes	
3 or av34	12		
If yes, v = 2359		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	2359	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.393
S
Space mean speed in ramp influence area, S = 56.0 mph
R
Space mean speed in outer lanes, S = 60.4 mph
O
Space mean speed for all vehicles, S = 58.2 mph

Average passenger-car speed, S 64.8 mi/h
 Number of lanes, N 4
 Density, D 25.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5313 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1444 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1624 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1624 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 56.0 mi/h
 Number of lanes, N 2
 Density, D 39.9 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: Marissa Titlow
 Agency or Company: Fehr and Peers
 Date Performed: 2/27/2008
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3655 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 993 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2235 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2235 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 4
 Density, D 22.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4820 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1310 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1474 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1474 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 4
 Density, D 19.6 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: Airport Blvd to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4520 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1228 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1277 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1277 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 21.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3635 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 988 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1370 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1370 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 5341 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5341	1170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1451	318	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	6038		1304		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 3368$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	6038	9400	No
Fi F			
v = v - v	4734	9400	No
FO F R			
v	1304	2100	No
R			
v v	1335 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3368	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.7$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.415$
S
Space mean speed in ramp influence area, $S = 55.4$ mph
R
Space mean speed in outer lanes, $S = 70.0$ mph
0
Space mean speed for all vehicles, $S = 61.1$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 21.2 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3374 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 917 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1375 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1375 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3374 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3374	580	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	917	158	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4126		646		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.627 Using Equation 5
FD
 $v = v + (v - v) P = 2828$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4126	7050	No
Fi F			
$v = v - v$	3480	7050	No
FO F R			
v	646	2100	No
R			
$v = v$	1298 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2828	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 25.9$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.356$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = 70.1$ mph
0
Space mean speed for all vehicles, $S = 60.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 2968 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 230 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2968	230	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	807	62	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3629	256	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 2147$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3885	7050	No
v/v	1482 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v/v > 2700$ pc/h?		No	
3 or av34			
Is $v/v > 1.5 v/2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2147	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.339
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = 61.5 mph
O
Space mean speed for all vehicles, S = 58.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	3
Free-flow speed on freeway	65.0 mph
Volume on freeway	3129 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	720 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	3129	720	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	850	196	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3826	802	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 2263$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4628	7050	No
FO			
v v	1563 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v	2263	4400	No
12			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.360
S
Space mean speed in ramp influence area, S = 56.7 mph
R
Space mean speed in outer lanes, S = 61.2 mph
O
Space mean speed for all vehicles, S = 58.2 mph

Average passenger-car speed, S 56.5 mi/h
 Number of lanes, N 2
 Density, D 39.3 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3633 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 987 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2221 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2221 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3633 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3633	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	987	155	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.889		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4443		635		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.620 Using Equation 5
FD
 $v = v + (v - v) P = 2995$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4443	7050	No
Fi F			
v = v - v	3808	7050	No
FO F R			
v	635	2100	No
R			
v v	1448 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2995	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 30.0$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = 69.6$ mph
0
Space mean speed for all vehicles, $S = 60.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3234 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 80 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3234	80	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	879	22	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3955	89	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3955 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4044	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3955	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.519
S
Space mean speed in ramp influence area, S = 53.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 53.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3290 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3290	330	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	894	90	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4023	368	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4023$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4391	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4023	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.591
S
Space mean speed in ramp influence area, S = 51.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.4 mph

Average passenger-car speed, S 58.3 mi/h
 Number of lanes, N 2
 Density, D 36.9 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3521 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 957 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2153 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2153 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3521 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 3260 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane 1000 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3521	3260	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	957	886	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4306	3632	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4306$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4306	4700	No
Fi F			
v = v - v	674	4700	No
FO F R			
v	3632	4100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4306	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 32.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.625$
S
Space mean speed in ramp influence area, $S = 50.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 50.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road LOOP ON RAMP
Jurisdiction:
Analysis Year: Cum PP NPP MITIGATION
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1239 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 240 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1239	240	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	337	65	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1515	267	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1515$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 1782 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1515	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.315
S
Space mean speed in ramp influence area, S = 57.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road SLIP ON RAMP
Jurisdiction:
Analysis Year: Cum PP NPP MITIGATION
Description:

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	1407 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	70 vph
Length of first accel/decel lane	590 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1407	70	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	382	19	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1721	78	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1721$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1799	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1721	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.291
S
Space mean speed in ramp influence area, S = 58.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.3 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.7 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1456 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 396 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 890 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 890 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 372 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 838 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 838 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.8 mi/h
 Number of lanes, N 2
 Density, D 25.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2880 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 783 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1628 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1628 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 20.1 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2310 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 628 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1306 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1306 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2310 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 990 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane 1000 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2310	990	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	628	269	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 2611 1103 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 2611$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	2611	4700	No
Fi F			
$v = v - v$	1508	4700	No
FO F R			
v	1103	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2611	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 17.7$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.397$
S
Space mean speed in ramp influence area, $S = 55.9$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego LoopOn/DiagOn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 2907 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 660 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2907	660	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	790	179	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3286	735	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.581 Using Equation 1
FM
 $v = v(P) = 1911$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4021	7050	No
$v v$	1375 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1911	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.363
S
Space mean speed in ramp influence area, S = 56.6 mph
R
Space mean speed in outer lanes, S = 61.8 mph
O
Space mean speed for all vehicles, S = 58.3 mph

Average passenger-car speed, S 64.6 mi/h
 Number of lanes, N 2
 Density, D 26.1 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2982 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 810 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1685 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1685 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2982 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 400 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2982	400	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	810	109	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3371		446		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3371$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3371	4700	No
Fi F			
$v = v - v$	2925	4700	No
FO F R			
v	446	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3371	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 30.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.338$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2702 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 610 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2702	610	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	734	166	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3054	680	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3054$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3734	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3054	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.459
S
Space mean speed in ramp influence area, S = 54.4 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.4 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3129 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 110 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3129	110	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	850	30	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3537	123	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 3537 \text{ pc/h}$
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3660	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700 \text{ pc/h?}$		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3537	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 30.8 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.428
S
Space mean speed in ramp influence area, S = 55.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 55.2 mph

Average passenger-car speed, S 63.8 mi/h
 Number of lanes, N 2
 Density, D 28.4 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3206 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 871 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1812 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1812 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3206 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3206	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	871	155	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.962 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 3624 635 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3624$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3624	4700	No
Fi F			
$v = v - v$	2989	4700	No
FO F R			
v	635	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3624	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 32.7$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	2807 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	25.0 mph
Volume on ramp	980 vph
Length of first accel/decel lane	500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	2807	980	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	763	266	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3173	1092	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3173$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4265	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v	3173	4400	No
12			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.574
S
Space mean speed in ramp influence area, S = 51.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3493 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3493	170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	949	46	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3949	189	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3949 pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4138	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v	3949	4400	No
12			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.5 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.520
S
Space mean speed in ramp influence area, S = 53.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 53.0 mph

Average passenger-car speed, S 60.7 mi/h
 Number of lanes, N 2
 Density, D 33.6 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3612 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 982 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2042 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2042 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Operational Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: AM Peak Period
Freeway/Direction: SR 99 SB
From/To: Mainline after Riego Loop On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Flow Inputs and Adjustments

Volume, V	2907	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	790	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi

Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fhV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1095	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1095	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3953 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1165 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	3953	1165	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1074	317	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4469	1298	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4469$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4469	4700	No
Fi F			
v	4469	4400	Yes
12			
v = v - v	3171	4700	No
FO F R			
v	1298	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 29.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.155$
S
Space mean speed in ramp influence area, $S = 61.4$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.4$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3655 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1165 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	3655	1165	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	993	317	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4132	1298	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2560 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5430	7050	No
FO			
v	3858	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.6 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.311
S
Space mean speed in ramp influence area, S = 57.9 mph
R
Space mean speed in outer lanes, S = 61.1 mph
0
Space mean speed for all vehicles, S = 58.8 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4520 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 885 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	4520	885	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1228	240	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5110	986	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.587 Using Equation 5
FD
 $v = v + (v - v) P = 3406$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5110	7050	No
Fi F			
v	3406	4400	No
12			
v = v - v	4124	7050	No
FO F R			
v	986	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 20.0+$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.127$
S
Space mean speed in ramp influence area, $S = 62.1$ mph
R
Space mean speed in outer lanes, $S = 68.6$ mph
0
Space mean speed for all vehicles, $S = 64.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	3
Free-flow speed on freeway	65.0 mph
Volume on freeway	3135 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	885 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	3135	885	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	852	240	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3834	986	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2375$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4820	7050	No
FO			
v	3361	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.238
S
Space mean speed in ramp influence area, S = 59.5 mph
R
Space mean speed in outer lanes, S = 61.5 mph
0
Space mean speed for all vehicles, S = 60.1 mph

Leisch Method for Weaving Analysis

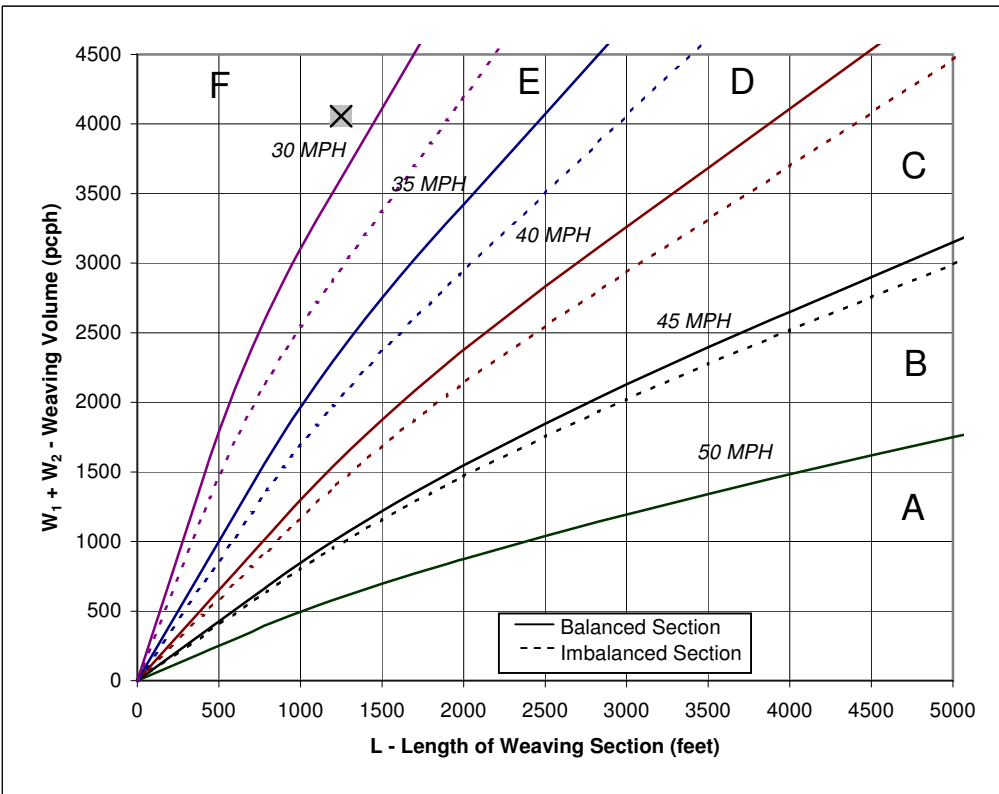
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

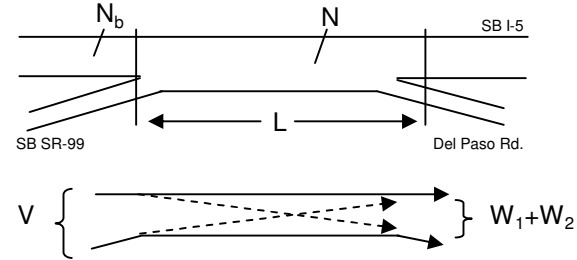
Project Information

Project	South Sutter County
Scenario	Cumulative PP NPP - AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	6,423	2,788	1,170
Truck Percentage	8%	5%	5%
PCE for Trucks	1.5	1.5	1.5
Volume (pcph)	6,680	2,858	1,199



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? N
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and 35 MPH
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) 24.0
- Weaving Intensity Factor (k) 3.00
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ 2,270
- Level of Service (LOS) F

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	6790	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	6790	3135
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.8889
----------	--------

v_i	8302.989	pc/hr/ln
-------	----------	----------

Density, D	30.2	pc/mi/ln
-------------------	------	----------

LOS	D
------------	---

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP NPP AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

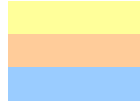
Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	4
Free-flow speed on freeway	65.0 mph
Volume on freeway	5656 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	800 vph
Length of first accel/decel lane	200 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5656	800	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1458	206	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6064	845	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.162 Using Equation 4
FM
 $v = v(P) = 981$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	6909	9400	No
v/v	2541 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v/v > 2700$ pc/h?		No	
3 or av34			
Is $v/v > 1.5 v/2$		Yes	
3 or av34	12		
If yes, v = 2425		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	2425	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 29.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.406
S
Space mean speed in ramp influence area, S = 55.7 mph
R
Space mean speed in outer lanes, S = 60.3 mph
O
Space mean speed for all vehicles, S = 58.0 mph

Average passenger-car speed, S 64.7 mi/h
 Number of lanes, N 4
 Density, D 25.8 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 6216 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1602 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1666 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1666 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 60.3 mi/h
 Number of lanes, N 2
 Density, D 34.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JJMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3845 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 991 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2061 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2061 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 4
 Density, D 19.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4785 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1233 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1283 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1283 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 4
 Density, D 20.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4935 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1272 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1348 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1348 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 59.8 mi/h
 Number of lanes, N 2
 Density, D 34.9 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: Marissa Titlow
 Agency or Company: Fehr and Peers
 Date Performed: 2/27/2008
 Analysis Time Period: PM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3820 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 985 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2087 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2087 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 5495 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 970 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5495	970	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1416	250	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 6005 1025 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 3196$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	6005	9400	No
Fi F			
v = v - v	4980	9400	No
FO F R			
v	1025	2100	No
R			
v v	1404 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3196	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 27.2$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.390$
S
Space mean speed in ramp influence area, $S = 56.0$ mph
R
Space mean speed in outer lanes, $S = 69.7$ mph
0
Space mean speed for all vehicles, $S = 61.7$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 23.7 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4305 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1110 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1539 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1539 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4305 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4305	1580	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1110	407	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00	0.00	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4616		1670		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.568 Using Equation 5
FD
 $v = v + (v - v) P = 3343$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4616	7050	No
Fi F			
v = v - v	2946	7050	No
FO F R			
v	1670	2100	No
R			
v v	1273 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3343	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 30.3$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.448$
S
Space mean speed in ramp influence area, $S = 54.7$ mph
R
Space mean speed in outer lanes, $S = 70.2$ mph
0
Space mean speed for all vehicles, $S = 58.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3199 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 250 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3199	250	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	824	64	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3430	264	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 2029$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3694	7050	No
$v v$	1401 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2029	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.335
S
Space mean speed in ramp influence area, S = 57.3 mph
R
Space mean speed in outer lanes, S = 61.8 mph
O
Space mean speed for all vehicles, S = 58.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3374 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 480 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3374	480	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	870	124	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3617	507	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 2139$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4124	7050	No
$v v$	1478 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2139	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.7$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.331
S
Space mean speed in ramp influence area, S = 57.4 mph
R
Space mean speed in outer lanes, S = 61.5 mph
O
Space mean speed for all vehicles, S = 58.8 mph

Average passenger-car speed, S 61.6 mi/h
 Number of lanes, N 2
 Density, D 32.3 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3710 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 956 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1989 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1989 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3710 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 840 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3710	840	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	956	216	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3978		888		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.620 Using Equation 5
FD
 $v = v + (v - v) P = 2803$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3978	7050	No
Fi F			
$v = v - v$	3090	7050	No
FO F R			
v	888	2100	No
R			
$v = v$	1175 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v = v > 2700$ pc/h?		No	
3 or av34			
Is $v = v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2803	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.378$
S
Space mean speed in ramp influence area, $S = 56.3$ mph
R
Space mean speed in outer lanes, $S = 70.6$ mph
0
Space mean speed for all vehicles, $S = 59.9$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3122 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 270 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3122	270	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	805	70	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3347	285	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3347$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3632	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3347	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 30.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.443
S
Space mean speed in ramp influence area, S = 54.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3311 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 220 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3311	220	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	853	57	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3550	232	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3550 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 3782 4700 No
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3550	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.7 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.447
S
Space mean speed in ramp influence area, S = 54.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.7 mph

Average passenger-car speed, S 63.4 mi/h
 Number of lanes, N 2
 Density, D 29.3 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riega Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3465 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 893 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1858 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1858 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3465 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 2890 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane 1000 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3465	2890	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	893	745	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3715	3054	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3715$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3715	4700	No
Fi F			
$v = v - v$	661	4700	No
FO F R			
v	3054	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3715	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 27.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.573$
S
Space mean speed in ramp influence area, $S = 51.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 51.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road LOOP ON RAMP
Jurisdiction:
Analysis Year: Cum PP NPP
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1442 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 810 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1442	810	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	372	209	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1546	856	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1546$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2402 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1546	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.335
S
Space mean speed in ramp influence area, S = 57.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road SLIP ON RAMP
Jurisdiction:
Analysis Year: Cum PP NPP MITIGATION
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2009 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 320 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2009	320	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	518	82	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2154	338	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 2154$ pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 2492 4700 No
FO
 $v v = 0$ pc/h (Equation 25-4 or 25-5)
3 or av34
Is $v v > 2700$ pc/h? No
3 or av34
Is $v v > 1.5 v / 2$ No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2154	4400	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.315
S
Space mean speed in ramp influence area, S = 57.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.8 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 18.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riega Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2233 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 576 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1197 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1197 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 22.8 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2760 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 711 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1480 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1480 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 13.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1600 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 412 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 874 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 874 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 14.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1715 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 442 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 937 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 937 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1715 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 600 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane 1000 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1715	600	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	442	155	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length 0.00 mi 0.00 mi mi
Trucks and buses PCE, ET 1.5 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fhV 0.943 0.976
Driver population factor, fP 1.00 1.00
Flow rate, vp 1874 634 pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1874$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1874	4700	No
Fi F			
$v = v - v$	1240	4700	No
FO F R			
v	634	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1874	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 11.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego DiagOn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3095 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 1840 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3095	1840	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	798	474	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3382	1944	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.581 Using Equation 1
FM
 $v = v(P) = 1966$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5326	7050	No
$v v$	1416 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1966	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.503
S
Space mean speed in ramp influence area, S = 53.4 mph
R
Space mean speed in outer lanes, S = 61.7 mph
O
Space mean speed for all vehicles, S = 55.4 mph

Average passenger-car speed, S 59.5 mi/h
 Number of lanes, N 2
 Density, D 35.3 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3843 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 990 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2100 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2100 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3843 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 620 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3843	620	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	990	160	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.943		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	4200		655		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4200$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4200	4700	No
Fi F			
v = v - v	3545	4700	No
FO F R			
v	655	2100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4200	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 37.7$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.357$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3409 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 360 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3409	360	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	879	93	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3725	380	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3725$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4105	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3725	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.533
S
Space mean speed in ramp influence area, S = 52.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3661 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3661	330	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	944	85	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4001	349	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4001$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4350	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4001	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.578
S
Space mean speed in ramp influence area, S = 51.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.7 mph

Average passenger-car speed, S 58.9 mi/h
 Number of lanes, N 2
 Density, D 36.1 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3892 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 1003 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 2127 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2127 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3892 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1070 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3892	1070	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1003	276	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4253	1131	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4253$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	4253	4700	No
Fi F			
$v = v - v$	3122	4700	No
FO F R			
v	1131	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4253	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 38.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, $D = 0.400$
S
Space mean speed in ramp influence area, $S = 55.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3143 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 370 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3143	370	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	810	95	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3435	391	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3435 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3826	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3435	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 32.0 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.475
S
Space mean speed in ramp influence area, S = 54.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.1 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP NPP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3402 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 110 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3402	110	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	877	28	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3718	116	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3718 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3834	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3718	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 32.2 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.456
S
Space mean speed in ramp influence area, S = 54.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.5 mph

Average passenger-car speed, S 62.9 mi/h
 Number of lanes, N 2
 Density, D 30.2 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3479 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 897 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1901 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1901 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 17.3 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Mainline after Riego Loop On
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP NPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3095 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 798 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1127 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1127 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3761 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 940 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3761	940	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	969	242	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4110	993	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4110$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4110	4700	No
Fi F			
v	4110	4400	No
12			
v = v - v	3117	4700	No
FO F R			
v	993	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 26.1$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.127$
S
Space mean speed in ramp influence area, $S = 62.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 62.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3845 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 940 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3845	940	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	991	242	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4122	993	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2554 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5115	7050	No
FO			
v	3547	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.3 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.261
S
Space mean speed in ramp influence area, S = 59.0 mph
R
Space mean speed in outer lanes, S = 61.2 mph
0
Space mean speed for all vehicles, S = 59.6 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4935 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1115 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4935	1115	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1272	287	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fhV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5393	1178	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.571 Using Equation 5
FD
 $v = v + (v - v) P = 3585$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5393	7050	No
Fi F			
v	3585	4400	No
12			
v = v - v	4215	7050	No
FO F R			
v	1178	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 21.6$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D = 0.144
S
Space mean speed in ramp influence area, S = 61.7 mph
R
Space mean speed in outer lanes, S = 68.2 mph
0
Space mean speed for all vehicles, S = 63.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP NPP
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	3
Free-flow speed on freeway	65.0 mph
Volume on freeway	4128 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	1115 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	4128	1115	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1064	287	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4426	1178	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2742$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5604	7050	No
FO			
v	3920	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.1$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.323
S
Space mean speed in ramp influence area, S = 57.6 mph
R
Space mean speed in outer lanes, S = 60.7 mph
0
Space mean speed for all vehicles, S = 58.5 mph

Leisch Method for Weaving Analysis

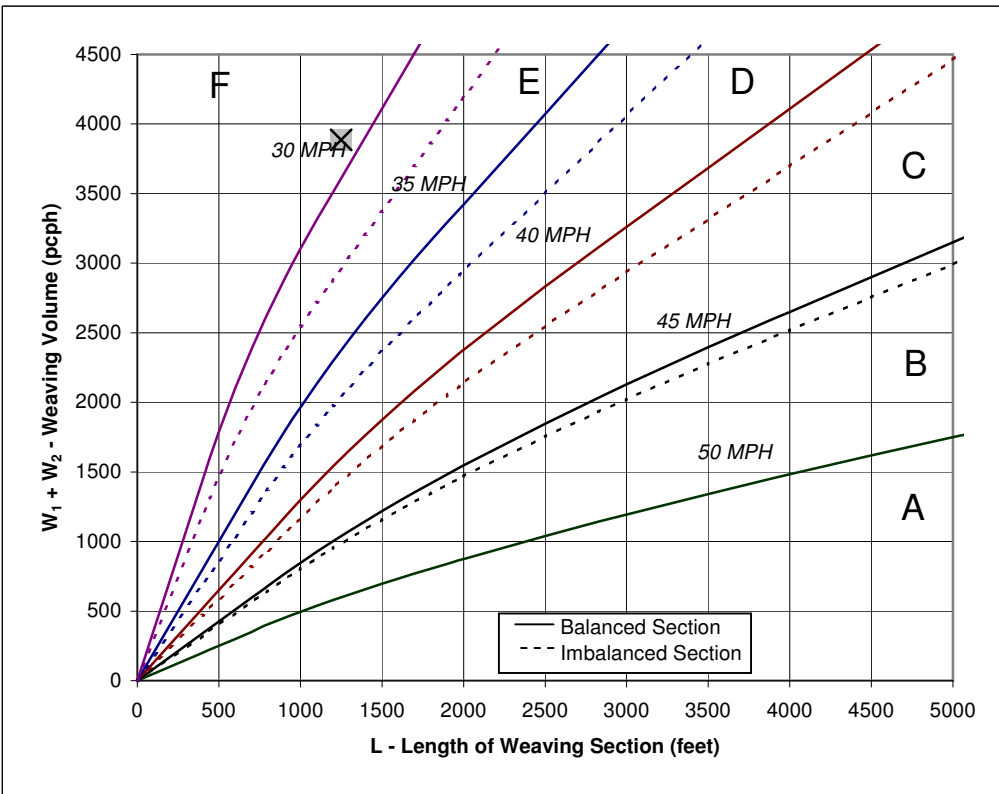
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

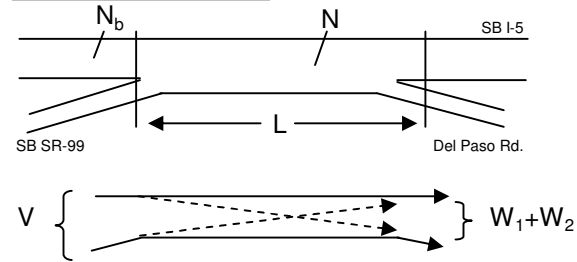
Project Information

Project	South Sutter County
Scenario	Cumulative PP NPP - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

	Total Weaving Section (V)	On-ramp to Mainline (W_1)	Mainline to Off-ramp (W_2)
Volume (vph)*	6,641	2,821	970
Truck Percentage	12%	5%	5%
PCE for Trucks	1.5	1.5	1.5
Volume (pcph)	7,039	2,892	994



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **25.0**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,257**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	8080	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	8080	4120
Lanes	3	2
Capacity Check	LOS F	OK

f_{HV} 0.9615

v_i 8663.093 pc/hr/ln

Density, D 31.5 pc/mi/ln

LOS LOS F

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP NPP PM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs































Reference:



CUMULATIVE CONDITIONS
PLUS PROJECT
WITH PLACER PARKWAY
WITH MITIGATION MEASURES

HCM Signalized Intersection Capacity Analysis
9: Riego Rd & Pleasant Grove Rd.

Sutter Pointe EIR
Cumulative Plus Project With PP With Mitigation AM

												
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	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1676		1770	1607	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	3433	1676		1770	1607	
Volume (vph)	30	650	260	100	1110	80	890	10	20	150	10	110
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)	33	707	283	109	1207	87	967	11	22	163	11	120
RTOR Reduction (vph)	0	0	215	0	0	62	0	17	0	0	92	0
Lane Group Flow (vph)	33	707	68	109	1207	25	967	16	0	163	39	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	1.4	17.7	17.7	5.1	21.4	21.4	23.3	16.0		19.1	11.8	
Effective Green, g (s)	1.4	17.7	17.7	5.1	21.4	21.4	23.3	16.0		19.1	11.8	
Actuated g/C Ratio	0.02	0.24	0.24	0.07	0.29	0.29	0.32	0.22		0.26	0.16	
Clearance Time (s)	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	
Lane Grp Cap (vph)	34	1218	379	122	1473	458	1082	363		457	257	
v/s Ratio Prot	0.02	0.14		c0.06	c0.24		c0.28	0.01		0.09	c0.02	
v/s Ratio Perm			0.04			0.02						
v/c Ratio	0.97	0.58	0.18	0.89	0.82	0.06	0.89	0.04		0.36	0.15	
Uniform Delay, d1	36.2	24.8	22.3	34.1	24.5	19.0	24.1	22.9		22.4	26.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	141.9	0.7	0.2	49.9	3.7	0.1	9.6	0.0		0.5	0.3	
Delay (s)	178.1	25.5	22.6	84.1	28.1	19.0	33.7	22.9		22.9	27.0	
Level of Service	F	C	C	F	C	B	C	C		C	C	
Approach Delay (s)		29.6			31.9			33.4			24.7	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			31.1				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			73.9				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			66.8%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

































HCM Signalized Intersection Capacity Analysis

10: Baseline Rd & Locust Rd

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	0.95	1.00	1.00	0.95	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	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1723	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1723	
Volume (vph)	10	760	50	90	1160	50	120	10	50	40	10	10
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)	11	826	54	98	1261	54	130	11	54	43	11	11
RTOR Reduction (vph)	0	0	27	0	0	24	0	0	45	0	10	0
Lane Group Flow (vph)	11	826	27	98	1261	30	130	11	9	43	12	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			
Actuated Green, G (s)	0.6	34.2	34.2	4.8	38.4	38.4	9.9	11.2	11.2	2.3	3.6	
Effective Green, g (s)	0.6	34.2	34.2	4.8	38.4	38.4	9.9	11.2	11.2	2.3	3.6	
Actuated g/C Ratio	0.01	0.50	0.50	0.07	0.56	0.56	0.14	0.16	0.16	0.03	0.05	
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)	16	1767	790	124	1984	887	256	305	259	59	91	
v/s Ratio Prot	0.01	0.23		c0.06	c0.36		c0.07	0.01		0.02	c0.01	
v/s Ratio Perm			0.02			0.02			0.01			
v/c Ratio	0.69	0.47	0.03	0.79	0.64	0.03	0.51	0.04	0.03	0.73	0.13	
Uniform Delay, d1	33.9	11.2	8.7	31.4	10.3	6.7	27.1	24.1	24.1	32.8	31.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	80.1	0.2	0.0	28.1	0.7	0.0	1.6	0.0	0.1	36.0	0.6	
Delay (s)	114.0	11.4	8.8	59.4	10.9	6.8	28.6	24.2	24.2	68.8	31.6	
Level of Service	F	B	A	E	B	A	C	C	C	E	C	
Approach Delay (s)		12.5			14.2			27.1			56.2	
Approach LOS		B			B			C			E	
Intersection Summary												
HCM Average Control Delay			15.6				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			68.5				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			58.7%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												



































HCM Signalized Intersection Capacity Analysis
12: Baseline Rd & Watt Ave

Sutter Pointe EIR
Cumulative Plus Project With PP With Mitigation AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	730	1240	130	640	1480	20	140	920	610	30	860	910
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)	793	1348	141	696	1609	22	152	1000	663	33	935	989
RTOR Reduction (vph)	0	0	49	0	0	12	0	0	359	0	0	0
Lane Group Flow (vph)	793	1348	92	696	1609	10	152	1000	304	33	935	989
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases			2			6			4			8
Actuated Green, G (s)	34.1	43.9	43.9	26.4	35.8	35.8	5.0	30.6	30.6	2.3	27.9	62.0
Effective Green, g (s)	34.1	45.9	45.9	26.0	37.8	37.8	5.0	30.9	30.9	2.3	28.2	62.3
Actuated g/C Ratio	0.28	0.38	0.38	0.21	0.31	0.31	0.04	0.26	0.26	0.02	0.23	0.51
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.0
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	3.0
Lane Grp Cap (vph)	967	1927	600	737	1587	494	142	1297	404	65	1184	867
v/s Ratio Prot	0.23	0.27		0.20	c0.32		c0.04	c0.20		0.01	0.18	c0.32
v/s Ratio Perm			0.06			0.01			0.19			0.30
v/c Ratio	0.82	0.70	0.15	0.94	1.01	0.02	1.07	0.77	0.75	0.51	0.79	1.14
Uniform Delay, d1	40.6	31.8	24.8	46.8	41.6	28.8	58.0	41.8	41.6	58.8	43.7	29.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.6	0.9	0.0	20.4	26.1	0.0	95.6	2.6	6.9	6.1	3.3	76.9
Delay (s)	46.3	32.7	24.8	67.2	67.7	28.8	153.6	44.5	48.5	65.0	47.0	106.3
Level of Service	D	C	C	E	E	C	F	D	D	E	D	F
Approach Delay (s)		36.9			67.2			55.1			77.3	
Approach LOS		D			E			E			E	
Intersection Summary												
HCM Average Control Delay			58.7			HCM Level of Service		E				
HCM Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			121.1			Sum of lost time (s)		16.0				
Intersection Capacity Utilization			98.9%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP With Mitigation AM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	320	920	40	270	990	400	10	1200	280	360	820	640
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)	348	1000	43	293	1076	435	11	1304	304	391	891	696
RTOR Reduction (vph)	0	0	31	0	0	6	0	0	148	0	0	26
Lane Group Flow (vph)	348	1000	12	293	1076	429	11	1304	156	391	891	670
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	13.0	30.0	30.0	11.7	28.7	41.7	0.6	43.2	43.2	13.0	55.6	68.6
Effective Green, g (s)	13.0	32.0	32.0	11.7	30.7	43.7	0.6	45.2	45.2	13.0	57.6	70.6
Actuated g/C Ratio	0.11	0.27	0.27	0.10	0.26	0.37	0.01	0.38	0.38	0.11	0.49	0.60
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	2.0	2.0	4.8	4.8	2.0	4.8	3.0
Lane Grp Cap (vph)	379	1380	430	341	1324	640	17	1357	607	379	1729	1002
v/s Ratio Prot	c0.10	0.20		0.09	c0.21	c0.07	0.00	c0.37		c0.11	0.25	0.07
v/s Ratio Perm			0.01			0.20			0.10			0.35
v/c Ratio	0.92	0.72	0.03	0.86	0.81	0.67	0.65	0.96	0.26	1.03	0.52	0.67
Uniform Delay, d1	51.9	39.0	31.5	52.3	40.9	31.1	58.5	35.5	24.9	52.4	20.6	15.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.5	2.3	0.0	18.3	4.4	2.1	49.2	16.2	0.4	54.6	0.5	1.7
Delay (s)	78.4	41.2	31.6	70.5	45.3	33.1	107.7	51.7	25.3	107.1	21.1	17.5
Level of Service	E	D	C	E	D	C	F	D	C	F	C	B
Approach Delay (s)		50.3			46.5			47.1			36.8	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay			44.6			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			117.9	Sum of lost time (s)			12.0					
Intersection Capacity Utilization			85.0%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP With Mitigation AM

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	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	50	20	10	30	30	290	20	80	10	310	40	40
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)	54	22	11	33	33	315	22	87	11	337	43	43
RTOR Reduction (vph)	0	0	9	0	0	249	0	0	10	0	0	26
Lane Group Flow (vph)	54	22	2	33	33	66	22	87	1	337	43	17
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	1.8	10.6	10.6	1.1	9.9	9.9	0.5	5.5	5.5	14.1	19.1	19.1
Effective Green, g (s)	1.8	10.6	10.6	1.1	9.9	9.9	0.5	5.5	5.5	14.1	19.1	19.1
Actuated g/C Ratio	0.04	0.22	0.22	0.02	0.21	0.21	0.01	0.12	0.12	0.30	0.40	0.40
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)	67	418	355	41	390	331	19	217	184	528	752	639
v/s Ratio Prot	c0.03	0.01		0.02	0.02		0.01	c0.05		c0.19	0.02	
v/s Ratio Perm			0.00			c0.04			0.00			0.01
v/c Ratio	0.81	0.05	0.01	0.80	0.08	0.20	1.16	0.40	0.01	0.64	0.06	0.03
Uniform Delay, d1	22.6	14.4	14.3	23.0	15.1	15.4	23.4	19.4	18.5	14.4	8.6	8.5
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	48.7	0.1	0.0	69.0	0.1	0.3	260.5	1.2	0.0	2.5	0.0	0.0
Delay (s)	71.3	14.5	14.3	92.0	15.1	15.7	283.9	20.6	18.5	16.9	8.6	8.5
Level of Service	E	B	B	F	B	B	F	C	B	B	A	A
Approach Delay (s)		49.7			22.3			68.7			15.2	
Approach LOS		D			C			E			B	
Intersection Summary												
HCM Average Control Delay			27.2				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			47.3				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			39.9%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Pleasant Grove Rd.

Sutter Pointe EIR
 Cumulative Plus Project With PP With Mitigation AM















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	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)	60	470	1490	10	210	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	511	1620	11	228	76
RTOR Reduction (vph)	0	0	0	5	0	60
Lane Group Flow (vph)	65	511	1620	6	228	16
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	2.9	41.8	34.9	34.9	13.8	13.8
Effective Green, g (s)	2.9	41.8	34.9	34.9	13.8	13.8
Actuated g/C Ratio	0.05	0.66	0.55	0.55	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)	81	2326	1942	869	384	343
v/s Ratio Prot	c0.04	0.14	c0.46		c0.13	
v/s Ratio Perm				0.00		0.01
v/c Ratio	0.80	0.22	0.83	0.01	0.59	0.05
Uniform Delay, d1	30.1	4.4	11.9	6.5	22.4	19.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	41.8	0.0	3.3	0.0	2.5	0.1
Delay (s)	71.8	4.4	15.2	6.5	24.8	19.8
Level of Service	E	A	B	A	C	B
Approach Delay (s)		12.0	15.1		23.6	
Approach LOS		B	B		C	

Intersection Summary

HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
Cumulative Plus Project With PP With Mitigation AM

												
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	0.97	0.91		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	3433	5085		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		5085	1583	3433	5085		1770		1583			
Volume (vph)	0	590	120	800	1470	0	200	0	470	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)	0	641	130	870	1598	0	217	0	511	0	0	0
RTOR Reduction (vph)	0	0	97	0	0	0	0	0	404	0	0	0
Lane Group Flow (vph)	0	641	33	870	1598	0	217	0	107	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		13.4	13.4	20.6	37.5		13.0		13.0			
Effective Green, g (s)		14.9	14.9	20.1	39.0		12.5		12.5			
Actuated g/C Ratio		0.25	0.25	0.34	0.66		0.21		0.21			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		1273	396	1160	3333		372		333			
v/s Ratio Prot		0.13		c0.25	c0.31		c0.12					
v/s Ratio Perm			0.02						0.07			
v/c Ratio		0.50	0.08	0.75	0.48		0.58		0.32			
Uniform Delay, d1		19.1	17.1	17.5	5.1		21.2		19.9			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		0.3	0.1	2.5	0.1		1.5		0.2			
Delay (s)		19.4	17.2	19.9	5.3		22.7		20.1			
Level of Service		B	B	B	A		C		C			
Approach Delay (s)		19.1			10.4			20.9			0.0	
Approach LOS		B			B			C			A	
Intersection Summary												
HCM Average Control Delay			14.0			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			59.5			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			55.3%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP AM With Mitigation















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		0.86	1.00		0.81	0.81				0.97		0.76
Frt		1.00	0.85		0.98	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		6408	1583		5934	1282				3433		3610
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		6408	1583		5934	1282				3433		3610
Volume (vph)	0	860	590	0	2640	1510	0	0	0	150	0	1350
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	935	641	0	2870	1641	0	0	0	163	0	1467
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	0	1
Lane Group Flow (vph)	0	935	641	0	3214	1280	0	0	0	163	0	1466
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		64.0	120.0		64.0	120.0				48.0		48.0
Effective Green, g (s)		64.0	120.0		64.0	120.0				48.0		48.0
Actuated g/C Ratio		0.53	1.00		0.53	1.00				0.40		0.40
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		3418	1583		3165	1282				1373		1444
v/s Ratio Prot		0.15			0.54					0.05		
v/s Ratio Perm			0.40			c1.00						0.41
v/c Ratio		0.27	0.40		1.02	1.00				0.12		1.02
Uniform Delay, d1		15.3	0.0		28.0	0.0				22.7		36.0
Progression Factor		0.50	1.00		0.84	1.00				1.00		1.00
Incremental Delay, d2		0.2	0.7		15.7	17.8				0.0		27.6
Delay (s)		7.8	0.7		39.3	17.8				22.7		63.6
Level of Service		A	A		D	B				C		E
Approach Delay (s)		4.9			33.2			0.0			59.5	
Approach LOS		A			C			A			E	

Intersection Summary			
HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			




























HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP AM With Mitigation

												
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		0.81	0.81		0.86	1.00	0.94		1.00			
Frt		0.99	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		6003	1282		6408	1583	4990		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		6003	1282		6408	1583	4990		1583			
Volume (vph)	0	690	320	0	2580	90	1570	0	1740	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)	0	750	348	0	2804	98	1707	0	1891	0	0	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	774	320	0	2804	98	1707	0	1891	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		64.5	120.0		64.5	120.0	47.5		120.0			
Effective Green, g (s)		64.5	120.0		64.5	120.0	47.5		120.0			
Actuated g/C Ratio		0.54	1.00		0.54	1.00	0.40		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		3227	1282		3444	1583	1975		1583			
v/s Ratio Prot		0.13			0.44		0.34					
v/s Ratio Perm			0.25			0.06			c1.19			
v/c Ratio		0.24	0.25		0.81	0.06	0.86		1.19			
Uniform Delay, d1		14.7	0.0		22.8	0.0	33.3		60.0			
Progression Factor		0.37	1.00		0.46	1.00	1.00		1.00			
Incremental Delay, d2		0.2	0.5		1.8	0.1	4.2		94.1			
Delay (s)		5.6	0.5		12.4	0.1	37.5		154.1			
Level of Service		A	A		B	A	D		F			
Approach Delay (s)		4.1			12.0			98.8			0.0	
Approach LOS		A			B			F			A	
Intersection Summary												
HCM Average Control Delay			51.9				HCM Level of Service		D			
HCM Volume to Capacity ratio			1.19									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			73.9%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: Riego Rd & Pleasant Grove Rd

Sutter Pointe EIR
Cumulative Plus Project With PP With Mitigation PM

												
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	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1622		1770	1628	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	3433	1622		1770	1628	
Volume (vph)	110	1360	710	60	820	140	630	10	60	50	10	50
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	113	1402	732	62	845	144	649	10	62	52	10	52
RTOR Reduction (vph)	0	0	514	0	0	106	0	39	0	0	44	0
Lane Group Flow (vph)	113	1402	218	62	845	38	649	33	0	52	18	0
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	5.2	19.7	19.7	3.1	17.6	17.6	16.8	24.1		3.3	10.6	
Effective Green, g (s)	5.2	19.7	19.7	3.1	17.6	17.6	16.8	24.1		3.3	10.6	
Actuated g/C Ratio	0.08	0.30	0.30	0.05	0.27	0.27	0.25	0.36		0.05	0.16	
Clearance Time (s)	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	
Lane Grp Cap (vph)	139	1513	471	83	1352	421	871	590		88	261	
v/s Ratio Prot	c0.06	c0.28		0.04	0.17		c0.19	0.02		0.03	c0.01	
v/s Ratio Perm			0.14			0.02						
v/c Ratio	0.81	0.93	0.46	0.75	0.62	0.09	0.75	0.06		0.59	0.07	
Uniform Delay, d1	30.0	22.5	18.9	31.2	21.4	18.3	22.7	13.7		30.8	23.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.1	10.0	0.7	30.2	0.9	0.1	3.5	0.0		10.2	0.1	
Delay (s)	59.1	32.6	19.7	61.3	22.3	18.4	26.2	13.7		41.0	23.7	
Level of Service	E	C	B	E	C	B	C	B		D	C	
Approach Delay (s)		29.7			24.1			25.0			31.6	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay			27.5				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			66.2				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			64.2%				ICU Level of Service		C			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis

10: Baseline Rd & Locust Rd


































Sutter Pointe EIR

Cumulative Plus Project With PP With Mitigation PM

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	0.95	1.00	1.00	0.95	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	0.95	1.00
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	3539	1583	1770	3539	1583	1770	1863	1583	1770	1773	1773
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1770	1773	1773
Volume (vph)	10	1320	140	40	930	40	80	10	190	90	20	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	10	1361	144	41	959	41	82	10	196	93	21	10
RTOR Reduction (vph)	0	0	75	0	0	20	0	0	112	0	8	0
Lane Group Flow (vph)	10	1361	69	41	959	21	82	10	84	93	23	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			
Actuated Green, G (s)	0.6	30.7	30.7	2.1	32.2	32.2	4.2	9.9	9.9	5.3	11.0	
Effective Green, g (s)	0.6	30.7	30.7	2.1	32.2	32.2	4.2	9.9	9.9	5.3	11.0	
Actuated g/C Ratio	0.01	0.48	0.48	0.03	0.50	0.50	0.07	0.15	0.15	0.08	0.17	
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)	17	1698	759	58	1781	796	116	288	245	147	305	
v/s Ratio Prot	0.01	c0.38		c0.02	0.27		0.05	0.01		c0.05	0.01	
v/s Ratio Perm			0.04			0.01			c0.05			
v/c Ratio	0.59	0.80	0.09	0.71	0.54	0.03	0.71	0.03	0.34	0.63	0.07	
Uniform Delay, d1	31.6	14.1	9.1	30.6	10.8	8.0	29.3	23.0	24.1	28.4	22.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	42.8	2.8	0.1	32.4	0.3	0.0	17.8	0.0	0.8	8.6	0.1	
Delay (s)	74.3	16.9	9.1	63.1	11.2	8.0	47.1	23.0	25.0	37.0	22.3	
Level of Service	E	B	A	E	B	A	D	C	C	D	C	
Approach Delay (s)		16.5			13.1			31.2			33.3	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM Average Control Delay			17.4				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			64.0				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			63.2%				ICU Level of Service		B			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 12: Baseline Rd & Watt Ave

Sutter Pointe EIR
 Cumulative Plus Project With PP With Mitigation PM

												
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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	1583
Volume (vph)	1010	1630	170	700	1390	20	170	920	660	20	990	880
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1041	1680	175	722	1433	21	175	948	680	21	1021	907
RTOR Reduction (vph)	0	0	45	0	0	12	0	0	322	0	0	1
Lane Group Flow (vph)	1041	1680	130	722	1433	9	175	948	358	21	1021	906
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases			2			6			4			8
Actuated Green, G (s)	40.0	48.7	48.7	29.0	37.3	37.3	7.0	35.5	35.5	2.3	30.8	70.8
Effective Green, g (s)	40.0	50.7	50.7	28.6	39.3	39.3	7.0	35.8	35.8	2.3	31.1	71.1
Actuated g/C Ratio	0.30	0.38	0.38	0.21	0.29	0.29	0.05	0.27	0.27	0.02	0.23	0.53
Clearance Time (s)	4.0	6.0	6.0	3.6	6.0	6.0	4.0	4.3	4.3	4.0	4.3	4.0
Vehicle Extension (s)	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	1.0	3.0	1.0	3.0
Lane Grp Cap (vph)	1029	1933	602	736	1498	466	180	1365	425	59	1185	891
v/s Ratio Prot	0.30	0.33		0.21	c0.28		c0.05	0.19		0.01	0.20	c0.30
v/s Ratio Perm			0.08			0.01			0.23			0.27
v/c Ratio	1.01	0.87	0.22	0.98	0.96	0.02	0.97	0.69	0.84	0.36	0.86	1.02
Uniform Delay, d1	46.7	38.3	27.9	52.1	46.2	33.4	63.1	43.9	46.1	64.8	49.1	31.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.0	4.3	0.1	28.3	14.0	0.0	58.6	1.3	13.5	3.7	6.4	34.4
Delay (s)	77.7	42.6	28.0	80.4	60.2	33.4	121.7	45.1	59.7	68.5	55.5	65.6
Level of Service	E	D	C	F	E	C	F	D	E	E	E	E
Approach Delay (s)		54.3			66.7			58.1			60.3	
Approach LOS		D			E			E			E	
Intersection Summary												
HCM Average Control Delay			59.5			HCM Level of Service		E				
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			133.4			Sum of lost time (s)		12.0				
Intersection Capacity Utilization			96.2%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 13: Baseline Rd & Fiddymnt Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP With Mitigation PM

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	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Volume (vph)	620	1220	70	250	1000	500	30	1050	280	440	1220	460
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	639	1258	72	258	1031	515	31	1082	289	454	1258	474
RTOR Reduction (vph)	0	0	49	0	0	6	0	0	159	0	0	8
Lane Group Flow (vph)	639	1258	23	258	1031	509	31	1082	130	454	1258	466
Turn Type	Prot		Perm	Prot		pm+ov	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2		1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	23.0	38.9	38.9	13.1	29.0	45.0	1.8	38.6	38.6	16.0	52.8	75.8
Effective Green, g (s)	23.0	40.9	40.9	13.1	31.0	47.0	1.8	40.6	40.6	16.0	54.8	77.8
Actuated g/C Ratio	0.18	0.32	0.32	0.10	0.24	0.37	0.01	0.32	0.32	0.13	0.43	0.61
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0
Vehicle Extension (s)	3.0	4.8	4.8	2.0	4.8	2.0	2.0	4.8	4.8	2.0	4.8	3.0
Lane Grp Cap (vph)	624	1643	511	355	1245	638	49	1135	508	434	1532	1023
v/s Ratio Prot	c0.19	0.25		0.08	0.20	c0.10	0.01	c0.31		c0.13	0.36	0.08
v/s Ratio Perm			0.01			0.22			0.08			0.21
v/c Ratio	1.02	0.77	0.05	0.73	0.83	0.80	0.63	0.95	0.26	1.05	0.82	0.46
Uniform Delay, d1	51.8	38.5	29.4	55.0	45.3	35.6	62.1	42.1	31.8	55.3	31.6	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.3	2.5	0.1	6.2	5.2	6.5	17.9	17.0	0.5	55.8	4.1	0.3
Delay (s)	94.1	41.1	29.5	61.2	50.5	42.0	80.0	59.0	32.3	111.1	35.7	13.4
Level of Service	F	D	C	E	D	D	E	E	C	F	D	B
Approach Delay (s)		57.9			49.6			54.0			46.5	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay			51.7			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			126.6			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			91.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 14: Elverta Rd & Power Line Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP With Mitigation PM

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	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Volume (vph)	20	50	10	30	10	500	20	80	10	560	40	90
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	21	52	10	31	10	515	21	82	10	577	41	93
RTOR Reduction (vph)	0	0	9	0	0	415	0	0	9	0	0	44
Lane Group Flow (vph)	21	52	1	31	10	100	21	82	1	577	41	49
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	1.5	6.0	6.0	8.6	13.1	13.1	1.5	5.6	5.6	31.2	35.3	35.3
Effective Green, g (s)	1.5	6.0	6.0	8.6	13.1	13.1	1.5	5.6	5.6	31.2	35.3	35.3
Actuated g/C Ratio	0.02	0.09	0.09	0.13	0.19	0.19	0.02	0.08	0.08	0.46	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)	39	166	141	226	362	308	39	155	132	819	976	829
v/s Ratio Prot	c0.01	0.03		0.02	0.01		0.01	c0.04		c0.33	0.02	
v/s Ratio Perm			0.00			c0.06			0.00			0.03
v/c Ratio	0.54	0.31	0.01	0.14	0.03	0.32	0.54	0.53	0.01	0.70	0.04	0.06
Uniform Delay, d1	32.6	28.8	28.0	26.1	22.0	23.3	32.6	29.6	28.3	14.4	7.8	7.9
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	13.5	1.1	0.0	0.3	0.0	0.6	13.5	3.2	0.0	2.8	0.0	0.0
Delay (s)	46.2	29.9	28.0	26.4	22.0	24.0	46.2	32.9	28.4	17.2	7.8	7.9
Level of Service	D	C	C	C	C	C	D	C	C	B	A	A
Approach Delay (s)		33.8			24.1			34.9			15.4	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM Average Control Delay			21.3				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			67.4				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			52.7%				ICU Level of Service		A			
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 17: Elverta Rd & Pleasant Grove Rd

Sutter Pointe EIR
 Cumulative Plus Project With PP With Mitigation PM















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	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)	160	1450	800	60	310	10
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	165	1495	825	62	320	10
RTOR Reduction (vph)	0	0	0	39	0	7
Lane Group Flow (vph)	165	1495	825	23	320	3
Turn Type	Prot		Perm		Perm	
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	5.2	27.0	17.8	17.8	14.0	14.0
Effective Green, g (s)	5.2	27.0	17.8	17.8	14.0	14.0
Actuated g/C Ratio	0.11	0.55	0.36	0.36	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)	188	1950	1286	575	506	452
v/s Ratio Prot	0.09	c0.42	0.23		c0.18	
v/s Ratio Perm				0.01		0.00
v/c Ratio	0.88	0.77	0.64	0.04	0.63	0.01
Uniform Delay, d1	21.6	8.6	13.0	10.1	15.3	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	33.7	1.9	1.1	0.0	2.6	0.0
Delay (s)	55.3	10.4	14.1	10.1	17.8	12.5
Level of Service	E	B	B	B	B	B
Approach Delay (s)		14.9	13.8		17.7	
Approach LOS		B	B		B	

Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 23: Elkhorn Blvd & Natomas Blvd

Sutter Pointe EIR
 Cumulative Plus Project With PP With Mitigation PM

												
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	0.97	0.91		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	3433	5085		1770		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		5085	1583	3433	5085		1770		1583			
Volume (vph)	0	1600	160	590	520	0	100	0	920	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1649	165	608	536	0	103	0	948	0	0	0
RTOR Reduction (vph)	0	0	111	0	0	0	0	0	248	0	0	0
Lane Group Flow (vph)	0	1649	54	608	536	0	103	0	700	0	0	0
Turn Type			Perm	Prot			Prot		custom			
Protected Phases		2		1	6		4					
Permitted Phases			2						4			
Actuated Green, G (s)		28.2	28.2	15.8	47.5		33.5		33.5			
Effective Green, g (s)		29.7	29.7	15.3	49.0		33.0		33.0			
Actuated g/C Ratio		0.33	0.33	0.17	0.54		0.37		0.37			
Clearance Time (s)		5.5	5.5	3.5	5.5		3.5		3.5			
Vehicle Extension (s)		3.0	3.0	2.0	3.0		2.0		2.0			
Lane Grp Cap (vph)		1678	522	584	2769		649		580			
v/s Ratio Prot		c0.32		c0.18	0.11		0.06					
v/s Ratio Perm			0.03						c0.44			
v/c Ratio		0.98	0.10	1.04	0.19		0.16		1.21			
Uniform Delay, d1		29.9	20.9	37.4	10.4		19.2		28.5			
Progression Factor		1.00	1.00	1.00	1.00		1.00		1.00			
Incremental Delay, d2		17.9	0.1	48.4	0.0		0.0		108.4			
Delay (s)		47.8	21.0	85.7	10.5		19.2		136.9			
Level of Service		D	C	F	B		B		F			
Approach Delay (s)		45.4			50.5			125.4			0.0	
Approach LOS		D			D			F			A	
Intersection Summary												
HCM Average Control Delay			67.8			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			94.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
48: Riego Rd & SB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP PM With Mitigation















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		0.86	1.00		0.81	0.81				0.97		0.76
Frt		1.00	0.85		0.95	0.85				1.00		0.85
Flt Protected		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (prot)		6408	1583		5756	1282				3433		3610
Flt Permitted		1.00	1.00		1.00	1.00				0.95		1.00
Satd. Flow (perm)		6408	1583		5756	1282				3433		3610
Volume (vph)	0	2550	1730	0	1930	1990	0	0	0	220	0	570
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	2629	1784	0	1990	2052	0	0	0	227	0	588
RTOR Reduction (vph)	0	0	0	0	77	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	2629	1784	0	2800	1165	0	0	0	227	0	580
Turn Type			Free			Free				Prot		custom
Protected Phases		2			6					4		
Permitted Phases			Free			Free						4
Actuated Green, G (s)		48.4	75.0		48.4	75.0				18.6		18.6
Effective Green, g (s)		48.4	75.0		48.4	75.0				18.6		18.6
Actuated g/C Ratio		0.65	1.00		0.65	1.00				0.25		0.25
Clearance Time (s)		4.0			4.0					4.0		4.0
Vehicle Extension (s)		3.0			3.0					3.0		3.0
Lane Grp Cap (vph)		4135	1583		3715	1282				851		895
v/s Ratio Prot		0.41			0.49					0.07		
v/s Ratio Perm			c1.13			0.91						0.16
v/c Ratio		0.64	1.13		0.75	0.91				0.27		0.65
Uniform Delay, d1		8.0	37.5		9.2	0.0				22.7		25.3
Progression Factor		0.43	1.00		0.93	1.00				1.00		1.00
Incremental Delay, d2		0.3	60.7		0.9	7.4				0.2		1.6
Delay (s)		3.7	98.2		9.5	7.4				22.9		26.9
Level of Service		A	F		A	A				C		C
Approach Delay (s)		41.9			8.9			0.0			25.8	
Approach LOS		D			A			A			C	

Intersection Summary

HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

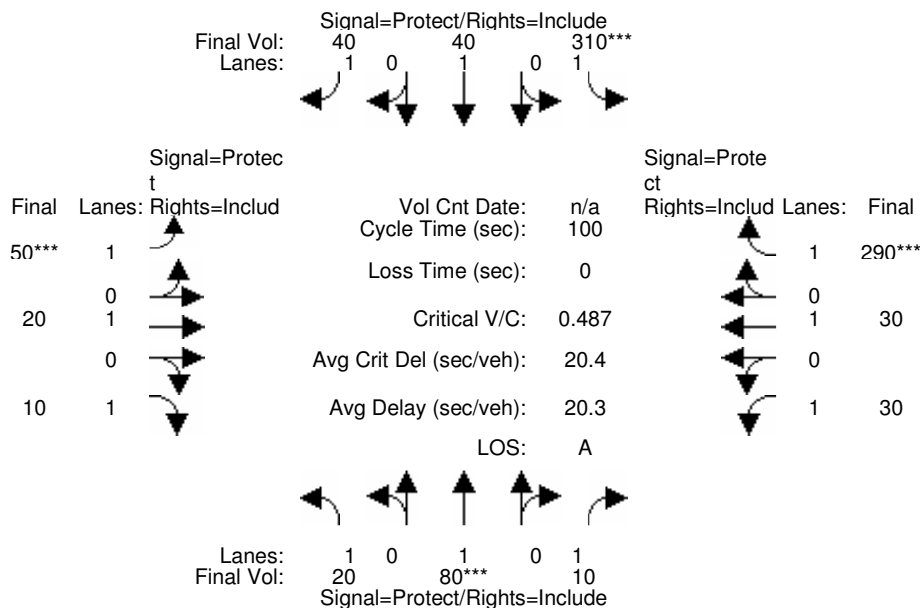
HCM Signalized Intersection Capacity Analysis
49: Riego Rd & NB Ramps

Sutter Pointe EIR
Cumulative Plus Project With PP PM With Mitigation

												
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		0.81	0.81		0.86	1.00	0.94		1.00			
Frt		0.97	0.85		1.00	0.85	1.00		0.85			
Flt Protected		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (prot)		5864	1282		6408	1583	4990		1583			
Flt Permitted		1.00	1.00		1.00	1.00	0.95		1.00			
Satd. Flow (perm)		5864	1282		6408	1583	4990		1583			
Volume (vph)	0	1590	1180	0	2990	340	930	0	1840	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	1639	1216	0	3082	351	959	0	1897	0	0	0
RTOR Reduction (vph)	0	44	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1978	833	0	3082	351	959	0	1897	0	0	0
Turn Type			Free			Free	Prot		Free			
Protected Phases		2			6		4					
Permitted Phases			Free			Free			Free			
Actuated Green, G (s)		45.9	75.0		45.9	75.0	21.1		75.0			
Effective Green, g (s)		45.9	75.0		45.9	75.0	21.1		75.0			
Actuated g/C Ratio		0.61	1.00		0.61	1.00	0.28		1.00			
Clearance Time (s)		4.0			4.0		4.0					
Vehicle Extension (s)		3.0			3.0		3.0					
Lane Grp Cap (vph)		3589	1282		3922	1583	1404		1583			
v/s Ratio Prot		0.34			0.48		0.19					
v/s Ratio Perm			0.65			0.22			c1.20			
v/c Ratio		0.55	0.65		0.79	0.22	0.68		1.20			
Uniform Delay, d1		8.5	0.0		10.9	0.0	24.0		37.5			
Progression Factor		0.81	1.00		1.05	1.00	1.00		1.00			
Incremental Delay, d2		0.5	2.0		0.7	0.1	1.4		95.7			
Delay (s)		7.4	2.0		12.1	0.1	25.4		133.2			
Level of Service		A	A		B	A	C		F			
Approach Delay (s)		5.8			10.9			97.0			0.0	
Approach LOS		A			B			F			A	
Intersection Summary												
HCM Average Control Delay			36.2				HCM Level of Service		D			
HCM Volume to Capacity ratio			1.20									
Actuated Cycle Length (s)			75.0				Sum of lost time (s)		0.0			
Intersection Capacity Utilization			67.7%				ICU Level of Service		C			
Analysis Period (min)			15									
c Critical Lane Group												

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP AM

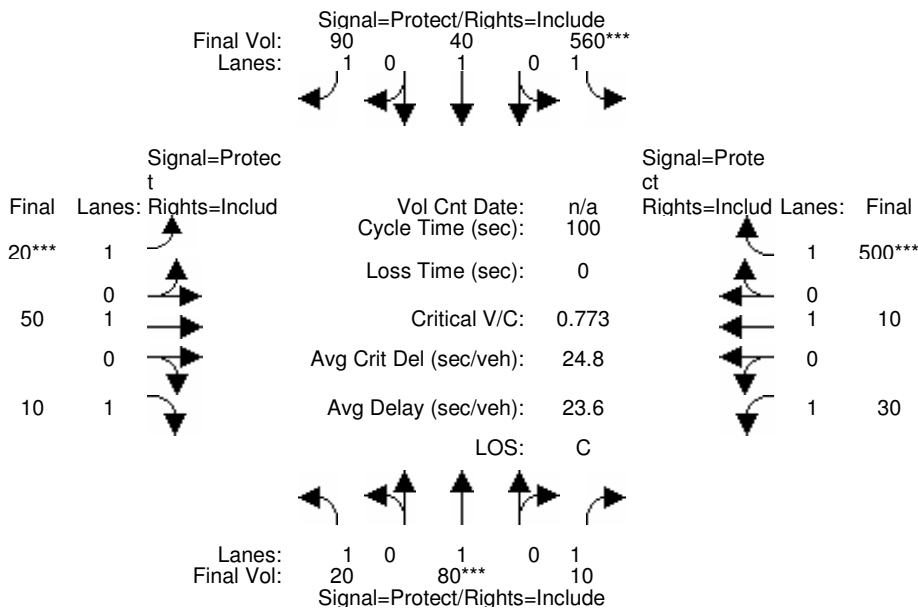
Intersection #114: MIT-Elverta Road / Powerline Road



Street Name:	Powerline Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	20	80	10	310	40	40	50	20	10	30	30	290
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	80	10	310	40	40	50	20	10	30	30	290
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	80	10	310	40	40	50	20	10	30	30	290
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	20	80	10	310	40	40	50	20	10	30	30	290
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	80	10	310	40	40	50	20	10	30	30	290
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	80	10	310	40	40	50	20	10	30	30	290
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Capacity Analysis Module:												
Vol/Sat:	0.01	0.05	0.01	0.21	0.03	0.03	0.03	0.01	0.01	0.02	0.02	0.19
Crit Volume:		80		310			50					290
Crit Moves:	****			****			****					****

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

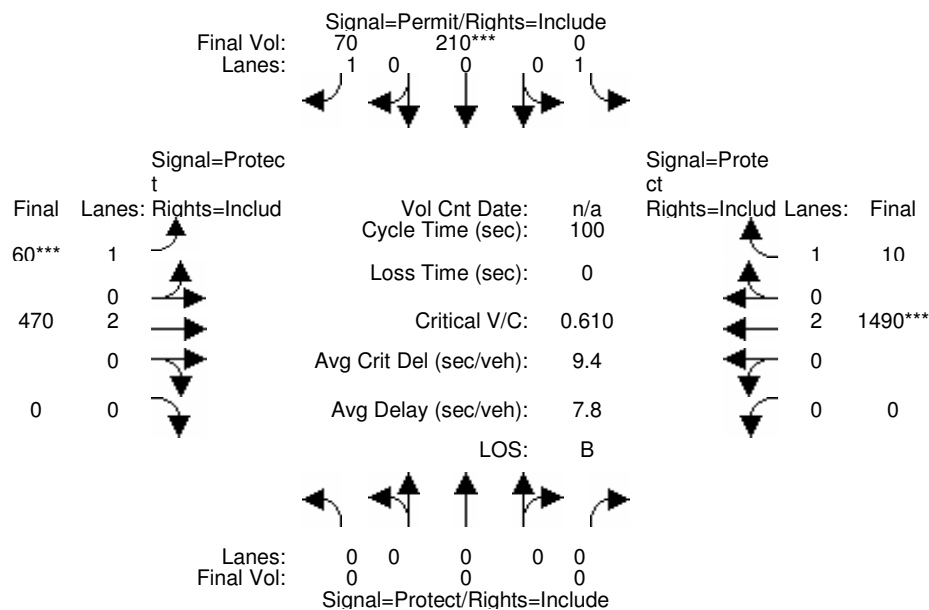
Intersection #114: MIT-Elverta Road / Powerline Road



Street Name:	Powerline Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	20	80	10	560	40	90	20	50	10	30	10	500
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	80	10	560	40	90	20	50	10	30	10	500
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	20	80	10	560	40	90	20	50	10	30	10	500
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	20	80	10	560	40	90	20	50	10	30	10	500
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	80	10	560	40	90	20	50	10	30	10	500
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	20	80	10	560	40	90	20	50	10	30	10	500
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Capacity Analysis Module:												
Vol/Sat:	0.01	0.05	0.01	0.37	0.03	0.06	0.01	0.03	0.01	0.02	0.01	0.33
Crit Volume:		80		560			20					500
Crit Moves:	****			****			****					****

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP AM

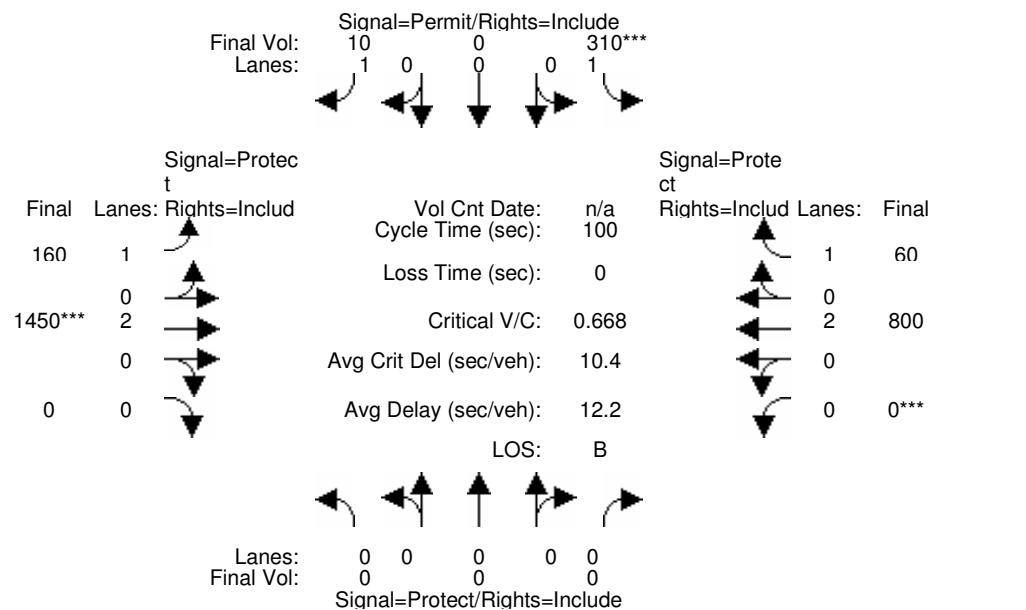
Intersection #117: MIT-Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	0	210	70	60	470	0	0	1490	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	210	70	60	470	0	0	1490	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	0	210	70	60	470	0	0	1490	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	0	210	70	60	470	0	0	1490	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	0	210	70	60	470	0	0	1490	10
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	0	210	70	60	470	0	0	1490	10
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.00	1.50	0.50	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	0	2325	775	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.00	0.09	0.09	0.04	0.15	0.00	0.00	0.48	0.01
Crit Volume:	0				140			60			745	
Crit Moves:				****			****			****		

Level Of Service Computation Report
Circular 212 Planning (Future Volume Alternative)
Cumulative Plus Project PP PM

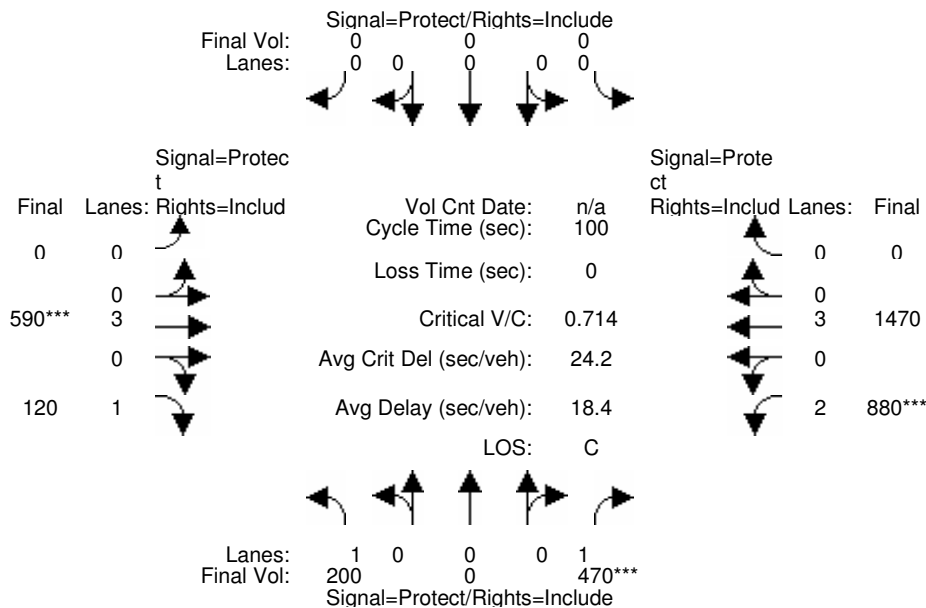
Intersection #117: MIT-Elverta Road / Sorento Road



Street Name:	Sorento Road						Elverta Road					
	North Bound			South Bound			East Bound			West Bound		
Approach:	L	T	R	L	T	R	L	T	R	L	T	R
Movement:												
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	0	0	310	0	10	160	1450	0	0	800	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	310	0	10	160	1450	0	0	800	60
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	310	0	10	160	1450	0	0	800	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	310	0	10	160	1450	0	0	800	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	310	0	10	160	1450	0	0	800	60
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	310	0	10	160	1450	0	0	800	60
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	1.00	0.00	1.00	1.00	2.00	0.00	0.00	2.00	1.00
Final Sat.:	0	0	0	1550	0	1550	1550	3100	0	0	3100	1550
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.20	0.00	0.01	0.10	0.47	0.00	0.00	0.26	0.04
Crit Volume:	0			310			725			0		
Crit Moves:				****			****			****		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP AM

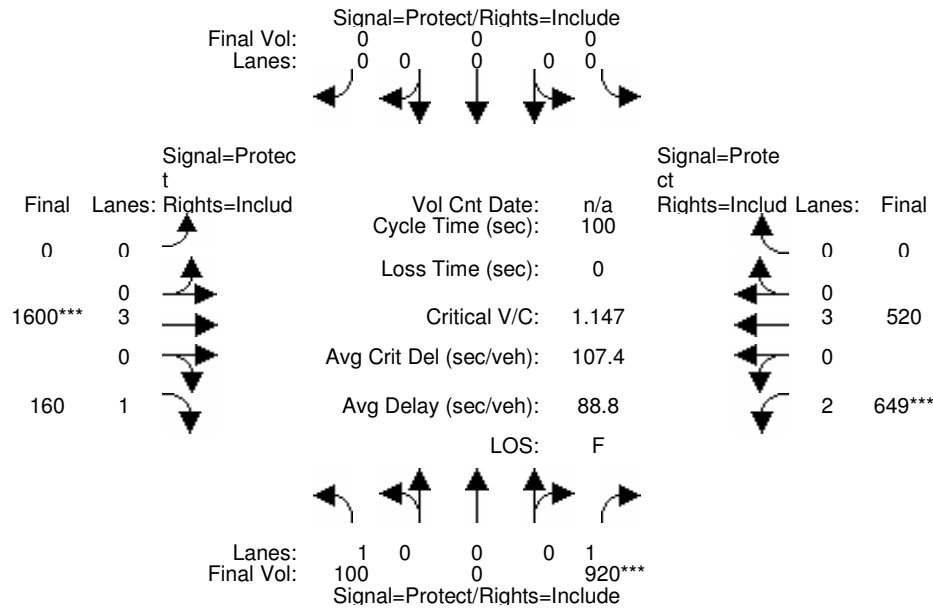
Intersection #123: MIT-Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	200	0	470	0	0	0	0	590	120	800	1470	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	200	0	470	0	0	0	0	590	120	800	1470	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	200	0	470	0	0	0	0	590	120	800	1470	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	200	0	470	0	0	0	0	590	120	800	1470	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	200	0	470	0	0	0	0	590	120	800	1470	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
FinalVolume:	200	0	470	0	0	0	0	590	120	880	1470	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	2.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	3100	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.13	0.00	0.30	0.00	0.00	0.00	0.00	0.13	0.08	0.28	0.32	0.00
Crit Volume:			470	0				197		440		
Crit Moves:			***					***		***		

Level Of Service Computation Report
 Circular 212 Planning (Future Volume Alternative)
 Cumulative Plus Project PP PM

Intersection #123: MIT-Elkhorn Boulevard / Natomas Boulevard



Street Name:	Natomas Boulevard						Elkhorn Boulevard					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	100	0	920	0	0	0	0	1600	160	590	520	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	100	0	920	0	0	0	0	1600	160	590	520	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	100	0	920	0	0	0	0	1600	160	590	520	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	100	0	920	0	0	0	0	1600	160	590	520	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	100	0	920	0	0	0	0	1600	160	590	520	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00
Final Volume:	100	0	920	0	0	0	0	1600	160	649	520	0
Saturation Flow Module:												
Sat/Lane:	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550	1550
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	3.00	1.00	2.00	3.00	0.00
Final Sat.:	1550	0	1550	0	0	0	0	4650	1550	3100	4650	0
Capacity Analysis Module:												
Vol/Sat:	0.06	0.00	0.59	0.00	0.00	0.00	0.00	0.34	0.10	0.21	0.11	0.00
Crit Volume:			920	0				533		325		
Crit Moves:			***					***		***		

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 NB
Junction: Del Paso Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	5
Free-flow speed on freeway	65.0 mph
Volume on freeway	4871 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	710 vph
Length of first accel/decel lane	200 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	4871	710	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1324	193	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5956	791	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.168 Using Equation 4
FM
v = v (P) = 763 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	5318	9400	No
v v	1882 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		Yes	
3 or av34	12		
If yes, v = 1810		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12A	1810	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.1 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.356
S
Space mean speed in ramp influence area, S = 56.8 mph
R
Space mean speed in outer lanes, S = 61.9 mph
O
Space mean speed for all vehicles, S = 59.3 mph

Average passenger-car speed, S 64.8 mi/h
 Number of lanes, N 4
 Density, D 25.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 2/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: Del Paso Road to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 5376 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1461 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1643 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1643 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 56.0 mi/h
 Number of lanes, N 2
 Density, D 40.0 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: Marissa Titlow
 Agency or Company: Fehr and Peers
 Date Performed: 2/27/2008
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3660 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 995 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2238 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2238 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 4
 Density, D 23.5 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 NB
 From/To: SR 99 to Airport Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4995 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1357 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1527 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1527 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 4
 Density, D 19.5 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: Airport Blvd to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 4495 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1221 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1270 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 4
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 1.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1270 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 60.4 mi/h
 Number of lanes, N 2
 Density, D 34.1 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: Marissa Titlow
 Agency or Company: Fehr and Peers
 Date Performed: 2/27/2008
 Analysis Time Period: AM Peak Period
 Freeway/Direction: I-5 SB
 From/To: SR 99 Conn to SR 99 Conn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3645 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 990 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2060 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2060 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Period
Freeway/Dir of Travel: I-5 SB
Junction: Del Paso Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 4
Free-flow speed on freeway 65.0 mph
Volume on freeway 5509 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5509	1170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1497	318	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6228	1304	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.436 Using Equation 8
FD
 $v = v + (v - v) P = 3451$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	6228	9400	No
Fi F			
v = v - v	4924	9400	No
FO F R			
v	1304	2100	No
R			
v v	1388 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3451	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 29.4$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.415$
S
Space mean speed in ramp influence area, $S = 55.4$ mph
R
Space mean speed in outer lanes, $S = 69.8$ mph
0
Space mean speed for all vehicles, $S = 61.0$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 21.4 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: I-5 to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3409 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 926 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 1390 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1390 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3409 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 580 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3409	580	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	926	158	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4169	646	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.626 Using Equation 5
FD
 $v = v + (v - v) P = 2852$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4169	7050	No
Fi F			
v = v - v	3523	7050	No
FO F R			
v	646	2100	No
R			
v v	1317 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2852	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 26.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.356$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = 70.1$ mph
0
Space mean speed for all vehicles, $S = 60.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3003 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 240 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3003	240	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	816	65	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3672	267	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 2172$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3939	7050	No
$v v$	1500 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2172	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.341
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = 61.4 mph
0
Space mean speed for all vehicles, S = 58.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3171 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 710 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3171	710	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	862	193	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3878	791	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v(P) = 2294$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4669	7050	No
$v v$	1584 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	2294	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 26.0$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.361
S
Space mean speed in ramp influence area, S = 56.7 mph
R
Space mean speed in outer lanes, S = 61.1 mph
O
Space mean speed for all vehicles, S = 58.1 mph

Average passenger-car speed, S 55.8 mi/h
 Number of lanes, N 2
 Density, D 40.2 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elkhorn Blvd to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3668 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 997 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2243 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2243 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3668 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 570 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3668	570	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	997	155	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4485	635	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.619 Using Equation 5
FD
 $v = v + (v - v) P = 3017$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4485	7050	No
Fi F			
v = v - v	3850	7050	No
FO F R			
v	635	2100	No
R			
v v	1468 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3017	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 30.2$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.355$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = 69.5$ mph
0
Space mean speed for all vehicles, $S = 60.4$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3269 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 100 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3269	100	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	888	27	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3997	111	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3997 pc/h
12 F FM

Capacity Checks

v Actual Maximum LOS F?
FO 4108 4700 No
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3997	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.3 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.533
S
Space mean speed in ramp influence area, S = 52.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road LOOP ON RAMP
Jurisdiction:
Analysis Year: Cum PP WPP MITIGATION
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1246 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 320 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1246	320	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	339	87	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1524	357	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1524$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1881	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1524	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 16.3$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.317
S
Space mean speed in ramp influence area, S = 57.7 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 57.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3339 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 320 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3339	320	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	907	87	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4083	357	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 4083$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4440	4700	No
$v v$	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4083	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.607
S
Space mean speed in ramp influence area, S = 51.0 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 51.0 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road SLIP ON RAMP
Jurisdiction:
Analysis Year: Cum PP NPP MITIGATION
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1470 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 90 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1470	90	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	399	24	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1798	100	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1798$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1898	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1798	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 16.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.294
S
Space mean speed in ramp influence area, S = 58.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.2 mph

Average passenger-car speed, S 57.6 mi/h
 Number of lanes, N 2
 Density, D 37.8 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Elverta Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3563 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 968 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 2178 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2178 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3563 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 3310 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane 1000 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3563	3310	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	968	899	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4357	3688	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4357$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4357	4700	No
Fi F			
v = v - v	669	4700	No
FO F R			
v	3688	4100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	4357	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 32.7$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.630$
S
Space mean speed in ramp influence area, $S = 50.5$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 50.5$ mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 14.4 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riego Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1533 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 417 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 937 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 937 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 NB
Junction: Placer Parkway
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 2190 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 960 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2190	960	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	595	261	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2678	1070	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.644 Using Equation 5
FD
 $v = v + (v - v) P = 2105$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	2678	7050	No
Fi F			
v = v - v	1608	7050	No
FO F R			
v	1070	2100	No
R			
v v	573 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	2105	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 19.7$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, $D = 0.394$
S
Space mean speed in ramp influence area, $S = 55.9$ mph
R
Space mean speed in outer lanes, $S = 71.3$ mph
0
Space mean speed for all vehicles, $S = 58.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Placer Parkway
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1230 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 140 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1230	140	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	334	38	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1504	156	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1504$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1660	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1504	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.297
S
Space mean speed in ramp influence area, S = 58.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.2 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.9 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1370 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 372 v
 Trucks and buses 25 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.889
 Driver population factor, fp 1.00
 Flow rate, vp 838 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 838 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 23.5 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: North of Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2700 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 734 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1526 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1526 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Placer Parkway
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2700 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 430 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2700	430	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	734	117	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3052		479		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3052$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3052	4700	No
Fi F			
$v = v - v$	2573	4700	No
FO F R			
v	479	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3052	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 27.8$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.341$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Placer Parkway
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1589 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 1820 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1589	1820	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	432	495	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1796	2028	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1796$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3824	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1796	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.455
S
Space mean speed in ramp influence area, S = 54.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 54.5 mph

Average passenger-car speed, S 64.8 mi/h
 Number of lanes, N 2
 Density, D 25.0 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Sankey Road to Riego Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2863 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 778 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1618 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1618 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Riego
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2863 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 2
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1500 vph
Length of first accel/decel lane 0 ft
Length of second accel/decel lane 1000 ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2863	1500	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	778	408	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3236	1671	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3236$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	3236	4700	No
Fi F			
v = v - v	1565	4700	No
FO F R			
v	1671	4100	No
R			
v v	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3236	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 23.1$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.448$
S
Space mean speed in ramp influence area, $S = 54.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 54.7$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Riego DiagOn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 2873 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 590 vph
Length of first accel/decel lane 140 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2873	590	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	740	152	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3140	623	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.581 Using Equation 1
FM
 $v = v(P) = 1826$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	3763	7050	No
$v v$	1314 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1826	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.354
S
Space mean speed in ramp influence area, S = 56.9 mph
R
Space mean speed in outer lanes, S = 62.1 mph
O
Space mean speed for all vehicles, S = 58.6 mph

Average passenger-car speed, S 63.4 mi/h
 Number of lanes, N 2
 Density, D 29.3 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Riego Road to Elverta Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3283 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 892 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1856 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1856 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3283 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 400 vph
Length of first accel/decel lane 300 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3283	400	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	892	109	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3711	446	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3711$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3711	4700	No
Fi F			
$v = v - v$	3265	4700	No
FO F R			
v	446	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3711	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 33.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.338$
S
Space mean speed in ramp influence area, $S = 57.2$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3003 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 610 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3003	610	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	816	166	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3395	680	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3395 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4075	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3395	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.8 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.526
S
Space mean speed in ramp influence area, S = 52.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 52.9 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3430 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 110 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3430	110	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	932	30	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3877	123	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 3877$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4000	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3877	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.489
S
Space mean speed in ramp influence area, S = 53.8 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 53.8 mph

Average passenger-car speed, S 61.7 mi/h
 Number of lanes, N 2
 Density, D 32.1 pc/mi/ln
 Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elverta Road to Elkhorn Blvd
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3507 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 953 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1982 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1982 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3507 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 580 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3507	580	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	953	158	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	3964		646		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3964$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3964	4700	No
Fi F			
$v = v - v$	3318	4700	No
FO F R			
v	646	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3964	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 29.3$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, $D = 0.356$
S
Space mean speed in ramp influence area, $S = 56.8$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.8$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3101 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 960 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3101	960	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	843	261	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3505	1070	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 3505 pc/h
12 F FM

Capacity Checks

Actual Maximum LOS F?
v 4575 4700 No
FO
v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 No
3 or av34 12
If yes, v = (Equation 25-8)
12A

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	3505	4400	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.5 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.674
S
Space mean speed in ramp influence area, S = 49.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 49.5 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3773 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 170 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3773	170	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1025	46	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4265	189	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 4265 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	4454	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	4265	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 37.0 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable, M = 0.611
S
Space mean speed in ramp influence area, S = 50.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 50.9 mph

Average passenger-car speed, S 57.0 mi/h
 Number of lanes, N 2
 Density, D 38.6 pc/mi/ln
 Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Elkhorn Blvd to I-5
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 3892 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 1058 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 2200 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 2200 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 12.1 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak
 Freeway/Direction: Placer Parkway EB
 From/To: SR 99 to Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1390 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 378 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 786 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 786 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: Placer Parkway EB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1390 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 690 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1390	690	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	378	187	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00	mi	0.00	mi	mi
Trucks and buses PCE, ET	1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		
Heavy vehicle adjustment, fHV	0.962		0.976		
Driver population factor, fP	1.00		1.00		
Flow rate, vp	1571		769		pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1571$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	1571	4700	No
Fi F			
$v = v - v$	802	4700	No
FO F R			
v	769	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	1571	4600	No
			!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 8.8$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, $D = 0.367$
S
Space mean speed in ramp influence area, $S = 56.6$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 56.6$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: Placer Parkway EB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	2
Free-flow speed on freeway	65.0 mph
Volume on freeway	700 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	45.0 mph
Volume on ramp	630 vph
Length of first accel/decel lane	1000 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	700	630	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	190	171	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	791	702	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 791 pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	1493	4700	No
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	791	4400	No
			!

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 10.5 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.248
S
Space mean speed in ramp influence area, S = 59.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 59.3 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 11.6 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak
 Freeway/Direction: Placer Parkway EB
 From/To: East of Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1330 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 361 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 752 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 752 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 64.9 mi/h
 Number of lanes, N 2
 Density, D 24.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak
 Freeway/Direction: Placer Parkway WB
 From/To: East of Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2790 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 758 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1577 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1577 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: Placer Parkway WB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 2790 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 1310 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	2790	1310	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	758	356	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3154	1460	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 3154$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
$v = v$	3154	4700	No
Fi F			
$v = v - v$	1694	4700	No
FO F R			
v	1460	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

Flow Entering Diverge Influence Area

v	Actual	Max Desirable	Violation?
12	3154	4600	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 22.4$ pc/mi/ln
R 12 D

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.429$
S
Space mean speed in ramp influence area, $S = 55.1$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 55.1$ mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: AM Peak
Freeway/Dir of Travel: Placer Parkway WB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1480 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 480 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1480	480	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	402	130	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

	mi	mi	mi
Length			
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1673	535	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v(P) = 1673$ pc/h
12 F FM

Capacity Checks

v	Actual	Maximum	LOS F?
FO	2208	4700	No
$v v$	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

Flow Entering Merge Influence Area

v	Actual	Max Desirable	Violation?
12	1673	4400	No
			!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 16.2$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.266
S
Space mean speed in ramp influence area, S = 58.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0
Space mean speed for all vehicles, S = 58.9 mph

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 17.0 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak
 Freeway/Direction: Placer Parkway WB
 From/To: Road C to SR 99
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 1960 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 533 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1108 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1108 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 3
 Density, D 17.0 pc/mi/ln
 Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
 E-mail:

Operational Analysis

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: AM Peak Period
 Freeway/Direction: SR 99 SB
 From/To: Mainline after Riego Loop On
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP WPP w/ Mit
 Description: South Sutter

Flow Inputs and Adjustments

Volume, V 2873 veh/h
 Peak-hour factor, PHF 0.92
 Peak 15-min volume, v15 781 v
 Trucks and buses 12 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.943
 Driver population factor, fp 1.00
 Flow rate, vp 1103 pc/h/ln

Speed Inputs and Adjustments

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 3
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 3.0 mi/h
 Free-flow speed, FFS 65.0 mi/h
 Urban Freeway

LOS and Performance Measures

Flow rate, vp 1103 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 4344 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1335 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4344	1335	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1180	363	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4911	1487	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4911$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4911	4700	Yes
Fi F			
v	4911	4400	Yes
12			
v = v - v	3424	4700	No
FO F R			
v	1487	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 33.0$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, $D = 0.172$
S
Space mean speed in ramp influence area, $S = 61.0$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.0$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	3
Free-flow speed on freeway	65.0 mph
Volume on freeway	3660 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	1335 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3660	1335	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	995	363	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4476	1487	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2773 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5963	7050	No
FO			
v	4260	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.6 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M = 0.402
S
Space mean speed in ramp influence area, S = 55.8 mph
R
Space mean speed in outer lanes, S = 60.7 mph
0
Space mean speed for all vehicles, S = 57.1 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4495 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 850 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	4495	850	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	1221	231	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5081	947	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.589 Using Equation 5
FD
 $v = v + (v - v) P = 3384$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5081	7050	No
Fi F			
v	3384	4400	No
12			
v = v - v	4134	7050	No
FO F R			
v	947	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 19.9$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D = 0.123
S
Space mean speed in ramp influence area, S = 62.2 mph
R
Space mean speed in outer lanes, S = 68.6 mph
0
Space mean speed for all vehicles, S = 64.2 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	3
Free-flow speed on freeway	65.0 mph
Volume on freeway	3182 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	850 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No
Volume on adjacent Ramp	vph
Position of adjacent Ramp	
Type of adjacent Ramp	
Distance to adjacent Ramp	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	3182	850	vph
Peak-hour factor, PHF	0.92	0.92	
Peak 15-min volume, v15	865	231	v
Trucks and buses	25	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.889	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3891	947	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2410$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	4838	7050	No
FO			
v	3357	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 21.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.238
S
Space mean speed in ramp influence area, S = 59.5 mph
R
Space mean speed in outer lanes, S = 61.5 mph
0
Space mean speed for all vehicles, S = 60.1 mph

Leisch Method for Weaving Analysis

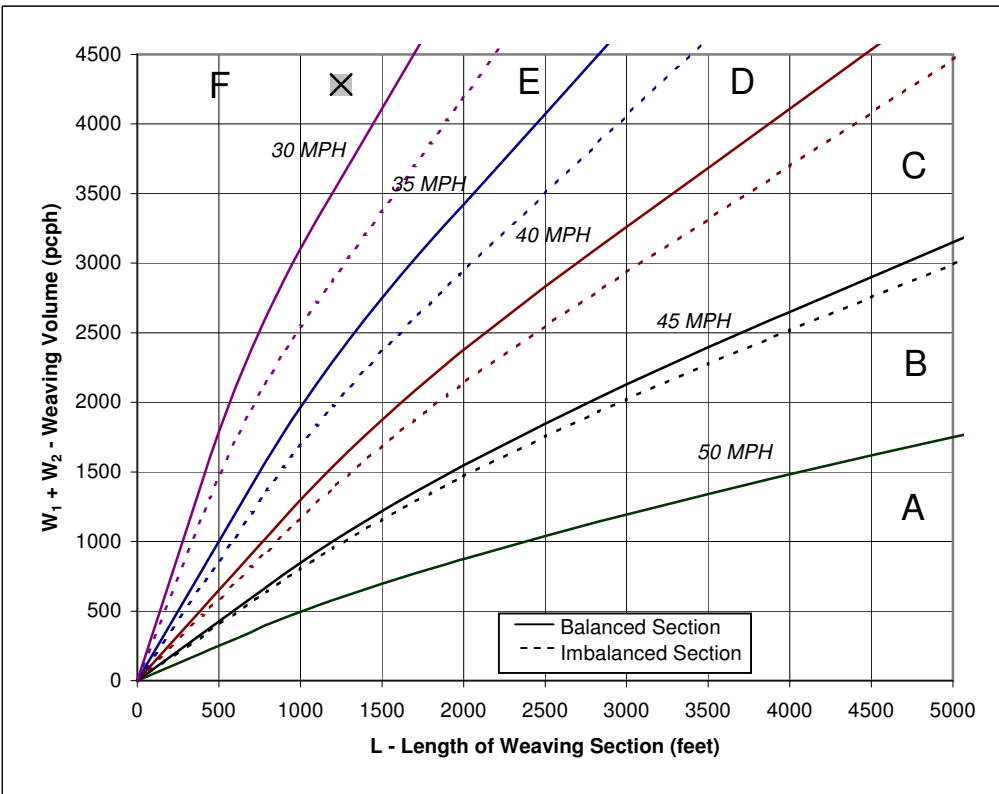
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

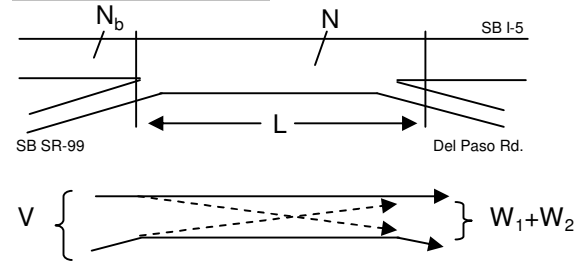
Project Information

Project	South Sutter County
Scenario	Cumulative PP WPP - AM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,654	Volume (vph)*	3,009	Volume (vph)*	1,170
Truck Percentage	8%	Truck Percentage	5%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	6,920	Volume (pcph)	3,084	Volume (pcph)	1,199



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **22.8**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,330**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	6080	n/a
PHF:	0.92	0.92
% Trucks & Buses (decimal)	0.25	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	6080	3182
Lanes	3	2
Capacity Check	OK	OK

f_{HV}	0.8889
----------	--------

v_i	7434.783	pc/hr/ln
-------	----------	----------

Density, D	27.0	pc/mi/ln
-------------------	------	----------

LOS	C
------------	---

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP WPP AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:



HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Period
 Freeway/Dir of Travel: I-5 NB
 Junction: Del Paso Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 4
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 5761 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 45.0 mph
 Volume on ramp 820 vph
 Length of first accel/decel lane 200 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp _____ vph
 Position of adjacent Ramp _____
 Type of adjacent Ramp _____
 Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	5761	820	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	1485	211	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6177	866	pcph

_____ Estimation of V12 Merge
 Areas _____

L = _____ (Equation 25-2 or 25-3)
 EQ
 P = 0.159 Using Equation 4
 FM
 $v = v (P) = 983$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	7043	9400	No
FO			
v v	2597 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		Yes	
3 or av34	12		
If yes, v = 2470		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	2470	4400	No
12A			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 29.8$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.413
 S
 Space mean speed in ramp influence area, S = 55.5 mph
 R
 Space mean speed in outer lanes, S = 60.1 mph
 0

Space mean speed for all vehicles, $S = 57.8$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: I-5 NB
From/To: Del Paso Road to SR 99
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 6335 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 1633 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 1698 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 4
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 1.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 1698 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 64.6 mi/h
Number of lanes, N 4
Density, D 26.3 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: Marissa Titlow
Agency or Company: Fehr and Peers
Date Performed: 2/27/2008
Analysis Time Period: PM Peak Period
Freeway/Direction: I-5 NB
From/To: SR 99 Conn to SR 99 Conn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 3835 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 988 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 2056 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 2056 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 60.4 mi/h
Number of lanes, N 2
Density, D 34.0 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: I-5 NB
From/To: SR 99 to Airport Blvd
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 4940 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 1273 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 1765 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 3
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 3.0 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 1765 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 64.2 mi/h
Number of lanes, N 3
Density, D 27.5 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: I-5 SB
From/To: SR 99 to Airport Blvd
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 4980 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 1284 v
Trucks and buses 12 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.943
Driver population factor, fp 1.00
Flow rate, vp 1814 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 3
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 3.0 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 1814 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 63.8 mi/h
Number of lanes, N 3
Density, D 28.4 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: Marissa Titlow
Agency or Company: Fehr and Peers
Date Performed: 2/27/2008
Analysis Time Period: PM Peak Period
Freeway/Direction: I-5 SB
From/To: SR 99 Conn to SR 99 Conn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 3815 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 983 v
Trucks and buses 12 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.943
Driver population factor, fp 1.00
Flow rate, vp 2084 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 2084 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 59.9 mi/h
Number of lanes, N 2
Density, D 34.8 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: Marissa Titlow
Agency or Company: Fehr and Peers
Date Performed: 2/27/2008
Analysis Time Period: PM Peak Period
Freeway/Direction: I-5 SB
From/To: SR 99 to Del Paso Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V	7820	veh/h
Peak-hour factor, PHF	0.97	
Peak 15-min volume, v15	2015	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2136	pc/h/ln

Speed Inputs and
Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp	2136	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	58.7	mi/h
Number of lanes, N	4	
Density, D	36.4	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Period
 Freeway/Dir of Travel: I-5 SB
 Junction: Del Paso Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 4
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 5474 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 950 vph
 Length of first accel/decel lane 500 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp _____ vph
 Position of adjacent ramp _____
 Type of adjacent ramp _____
 Distance to adjacent ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	5474	950	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	1411	245	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5982	1004	pcph

_____ Estimation of V12 Diverge
 Areas _____

$$L = \text{(Equation 25-8 or 25-9)}$$

$$EQ$$

$$P = 0.436 \text{ Using Equation 8}$$

$$FD$$

$$v = v + (v - v) P = 3174 \text{ pc/h}$$

$$12 \quad R \quad F \quad R \quad FD$$

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	5982	9400	No
$F_i \quad F$			
$v = v - v$	4978	9400	No
$FO \quad F \quad R$			
v	1004	2100	No
R			
$v \quad v$	1404 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v \quad v > 2700 \text{ pc/h?}$		No	
3 or av34			
Is $v \quad v > 1.5 \quad v / 2$		No	
3 or av34	12		
If yes, $v =$		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	3174	4600	No
12			!

_____ Level of Service Determination (if not F) _____

$$\text{Density, } D = 4.252 + 0.0086 \quad v - 0.009 \quad L = 27.0 \text{ pc/mi/ln}$$

$$R \quad 12 \quad D$$

Level of service for ramp-freeway junction areas of influence C

_____ Speed
 Estimation _____

$$\text{Intermediate speed variable, } D = 0.388$$

$$S$$

Space mean speed in ramp influence area, $S = 56.1$ mph

Space mean speed in outer lanes, $S = 69.7$ mph

Space mean speed for all vehicles, $S = 61.7$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: Marissa Titlow
Agency or Company: Fehr and Peers
Date Performed: 2/27/2008
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 NB
From/To: I-5 to Elkhorn Blvd
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 4780 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 1232 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 1708 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 3
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 3.0 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 1708 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 64.5 mi/h
Number of lanes, N 3
Density, D 26.5 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: Kim Fox
 Agency/Co.: Fehr and Peers
 Date performed: 8/23/07
 Analysis time period: PM Peak
 Freeway/Dir of Travel: SR-99 NB
 Junction: Elkhorn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 3
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 4780 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 1580 vph
 Length of first accel/decel lane 300 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp _____ vph
 Position of adjacent ramp _____
 Type of adjacent ramp _____
 Distance to adjacent ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	4780	1580	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	1232	407	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5125	1670	pcph

_____ Estimation of V12 Diverge
 Areas _____

L = _____ (Equation 25-8 or 25-9)
 EQ
 P = 0.555 Using Equation 5
 FD
 $v = v + (v - v) P = 3588$ pc/h
 12 R F R FD

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	5125	7050	No
$F_i F$			
$v = v - v$	3455	7050	No
$F_O F R$			
v	1670	2100	No
R			
$v v$	1537 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v =$		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

v	Actual	Max Desirable	Violation?
12	3588	4600	No

_____ Level of Service Determination (if not F) _____

Density, $D = 4.252 + 0.0086 v - 0.009 L = 32.4$ pc/mi/ln
 R 12 D
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, $D = 0.448$
 S

Space mean speed in ramp influence area, $S = 54.7$ mph

Space mean speed in outer lanes, $S = 69.2$ mph

Space mean speed for all vehicles, $S = 58.4$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Merge
Analysis _____

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

_____ Freeway
Data _____

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3360	vph

_____ On Ramp
Data _____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	25.0	mph
Volume on ramp	250	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	3360	250	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	866	64	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3602	264	pcph

_____ Estimation of V12 Merge
Areas _____

L = _____ (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v (P) = 2131$ pc/h
12 F FM

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
v	3866	7050	No
FO			
v v	1471 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
Area _____

	Actual	Max Desirable	Violation?
v	2131	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

_____ Speed
Estimation _____

Intermediate speed variable, M = 0.339
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = 61.5 mph
0

Space mean speed for all vehicles, $S = 58.8$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Merge
Analysis _____

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Elkhorn
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

_____ Freeway
Data _____

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3535 vph

_____ On Ramp
Data _____

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 480 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
Volume on adjacent Ramp _____ vph
Position of adjacent Ramp _____
Type of adjacent Ramp _____
Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3535	480	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	911	124	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3790	507	pcph

_____ Estimation of V12 Merge
Areas _____

L = _____ (Equation 25-2 or 25-3)
EQ
P = 0.591 Using Equation 1
FM
 $v = v (P) = 2242$ pc/h
12 F FM

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
v	4297	7050	No
FO			
v v	1548 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
Area _____

	Actual	Max Desirable	Violation?
v	2242	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

_____ Speed
Estimation _____

Intermediate speed variable, M = 0.337
S
Space mean speed in ramp influence area, S = 57.3 mph
R
Space mean speed in outer lanes, S = 61.2 mph
0

Space mean speed for all vehicles, $S = 58.6$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 NB
From/To: Elkhorn Blvd to Elverta Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 3871 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 998 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 2075 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 2075 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 60.0 mi/h
Number of lanes, N 2
Density, D 34.6 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak
 Freeway/Dir of Travel: SR-99 NB
 Junction: Elverta
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 3
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3871 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 840 vph
 Length of first accel/decel lane 0 ft
 Length of second accel/decel lane ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp vph
 Position of adjacent ramp
 Type of adjacent ramp
 Distance to adjacent ramp ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3871	840	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	998	216	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4150	888	pcph

_____ Estimation of V12 Diverge
 Areas _____

L = (Equation 25-8 or 25-9)
 EQ
 P = 0.615 Using Equation 5
 FD
 $v = v + (v - v) P = 2895$ pc/h
 12 R F R FD

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	4150	7050	No
Fi F			
$v = v - v$	3262	7050	No
FO F R			
v	888	2100	No
R			
$v v$	1255 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

v	Actual	Max Desirable	Violation?
12	2895	4600	No

_____ Level of Service Determination (if not F) _____

Density, $D = 4.252 + 0.0086 v - 0.009 L = 29.1$ pc/mi/ln
 R 12 D
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, $D = 0.378$
 S

Space mean speed in ramp influence area, $S = 56.3$ mph

Space mean speed in outer lanes, $S = 70.3$ mph

Space mean speed for all vehicles, $S = 59.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: SR-99 NB
 Junction: Elverta
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3283 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 25.0 mph
 Volume on ramp 270 vph
 Length of first accel/decel lane 500 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp _____ vph
 Position of adjacent Ramp _____
 Type of adjacent Ramp _____
 Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3283	270	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	846	70	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3520	285	pcph

_____ Estimation of V12 Merge
 Areas _____

L = _____ (Equation 25-2 or 25-3)
 EQ
 P = 1.000 Using Equation 0
 FM
 $v = v (P) = 3520$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	3805	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	3520	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 31.9$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.471
 S
 Space mean speed in ramp influence area, S = 54.2 mph
 R
 Space mean speed in outer lanes, S = N/A mph
 0

Space mean speed for all vehicles, $S = 54.2$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Merge
Analysis _____

Analyst: Matt Kittelson
Agency/Co.: Fehr & Peers
Date performed: 9/13/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego Road LOOP ON RAMP
Jurisdiction: _____
Analysis Year: Cum PP WPP MITIGATION
Description: _____

_____ Freeway
Data _____

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1638 vph

_____ On Ramp
Data _____

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 25.0 mph
Volume on ramp 1180 vph
Length of first accel/decel lane 590 ft
Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
Volume on adjacent Ramp _____ vph
Position of adjacent Ramp _____
Type of adjacent Ramp _____
Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1638	1180	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	422	304	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1756	1247	pcph

_____ Estimation of V12 Merge
Areas _____

L = _____ (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 1756$ pc/h
12 F FM

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
v	3003	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
Area _____

	Actual	Max Desirable	Violation?
v	1756	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.6$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

_____ Speed
Estimation _____

Intermediate speed variable, M = 0.370
S
Space mean speed in ramp influence area, S = 56.5 mph
R
Space mean speed in outer lanes, S = N/A mph
0

Space mean speed for all vehicles, $S = 56.5$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: SR-99 NB
 Junction: Elverta
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3472 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 45.0 mph
 Volume on ramp 150 vph
 Length of first accel/decel lane 500 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp _____ vph
 Position of adjacent Ramp _____
 Type of adjacent Ramp _____
 Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3472	150	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	895	39	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3723	159	pcph

_____ Estimation of V12 Merge
 Areas _____

L = _____ (Equation 25-2 or 25-3)
 EQ
 P = 1.000 Using Equation 0
 FM
 $v = v (P) = 3723$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	3882	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	3723	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 32.5$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.465
 S
 Space mean speed in ramp influence area, S = 54.3 mph
 R
 Space mean speed in outer lanes, S = N/A mph
 0

Space mean speed for all vehicles, $S = 54.3$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: Matt Kittelson
 Agency/Co.: Fehr & Peers
 Date performed: 9/13/2007
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: SR-99 NB
 Junction: Riego Road SLIP ON RAMP
 Jurisdiction: _____
 Analysis Year: Cum PP WPP MITIGATION
 Description: _____

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 2464 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 45.0 mph
 Volume on ramp 340 vph
 Length of first accel/decel lane 590 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp _____ vph
 Position of adjacent Ramp _____
 Type of adjacent Ramp _____
 Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2464	340	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	635	88	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2642	359	pcph

_____ Estimation of V12 Merge
 Areas _____

L = _____ (Equation 25-2 or 25-3)
 EQ
 P = 1.000 Using Equation 0
 FM
 $v = v (P) = 2642$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	3001	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	2642	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 25.0$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence C

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.346
 S
 Space mean speed in ramp influence area, S = 57.0 mph
 R
 Space mean speed in outer lanes, S = N/A mph
 0

Space mean speed for all vehicles, $S = 57.0$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 NB
From/To: Elverta Road to Riega Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 3577 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 922 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 1918 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 1918 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 62.7 mi/h
Number of lanes, N 2
Density, D 30.6 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak
 Freeway/Dir of Travel: SR-99 NB
 Junction: Riego
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3577 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 2
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 2770 vph
 Length of first accel/decel lane 0 ft
 Length of second accel/decel lane 1000 ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp _____ vph
 Position of adjacent ramp _____
 Type of adjacent ramp _____
 Distance to adjacent ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3577	2770	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	922	714	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3835	2927	pcph

_____ Estimation of V12 Diverge
 Areas _____

L = _____ (Equation 25-8 or 25-9)
 EQ
 P = 1.000 Using Equation 0
 FD
 $v = v + (v - v) P = 3835 \text{ pc/h}$
 12 R F R FD

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	3835	4700	No
Fi F			
$v = v - v$	908	4700	No
FO F R			
v	2927	4100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700 \text{ pc/h?}$		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

v	Actual	Max Desirable	Violation?
12	3835	4600	No

_____ Level of Service Determination (if not F) _____

Density, $D = 4.252 + 0.0086 v - 0.009 L = 28.2 \text{ pc/mi/ln}$
 R 12 D
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, $D = 0.561$
 S

Space mean speed in ramp influence area, $S = 52.1$ mph

Space mean speed in outer lanes, $S = N/A$ mph

Space mean speed for all vehicles, $S = 52.1$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Merge
Analysis _____

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Riego LOOP ON/DIAG ON
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

_____ Freeway
Data _____

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1638	vph

_____ On Ramp
Data _____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1520	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	1638	1520	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	422	392	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1756	1606	pcph

_____ Estimation of V12 Merge
Areas _____

L = _____ (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 1756$ pc/h
12 F FM

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
v	3362	4700	No
FO			
v v	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
Area _____

	Actual	Max Desirable	Violation?
v	1756	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 22.8$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

_____ Speed
Estimation _____

Intermediate speed variable, M = 0.343
S
Space mean speed in ramp influence area, S = 57.1 mph
R
Space mean speed in outer lanes, S = N/A mph
0

Space mean speed for all vehicles, $S = 57.1$ mph

Phone: _____ Fax: _____
 E-mail: _____

Operational
 Analysis _____

Analyst: JMO
 Agency or Company: Fehr and Peers
 Date Performed: 5/19/08
 Analysis Time Period: PM Peak Period
 Freeway/Direction: SR 99 NB
 From/To: Riega Road to Sankey Road
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

Flow Inputs and
 Adjustments _____

Volume, V 2702 veh/h
 Peak-hour factor, PHF 0.97
 Peak 15-min volume, v15 696 v
 Trucks and buses 8 %
 Recreational vehicles 0 %
 Terrain type: Level
 Grade 0.00 %
 Segment length 0.00 mi
 Trucks and buses PCE, ET 1.5
 Recreational vehicle PCE, ER 1.2
 Heavy vehicle adjustment, fHV 0.962
 Driver population factor, fp 1.00
 Flow rate, vp 1448 pc/h/ln

Speed Inputs and
 Adjustments _____

Lane width 12.0 ft
 Right-shoulder lateral clearance 6.0 ft
 Interchange density 0.50 interchange/mi
 Number of lanes, N 2
 Free-flow speed: Measured
 FFS or BFFS 65.0 mi/h
 Lane width adjustment, fLW 0.0 mi/h
 Lateral clearance adjustment, fLC 0.0 mi/h
 Interchange density adjustment, fID 0.0 mi/h
 Number of lanes adjustment, fN 4.5 mi/h
 Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures _____

Flow rate, vp 1448 pc/h/ln
 Free-flow speed, FFS 65.0 mi/h
 Average passenger-car speed, S 65.0 mi/h
 Number of lanes, N 2
 Density, D 22.3 pc/mi/ln
 Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak
 Freeway/Dir of Travel: SR-99 NB
 Junction: Placer Parkway
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 3
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3860 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 1630 vph
 Length of first accel/decel lane 300 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp _____ vph
 Position of adjacent ramp _____
 Type of adjacent ramp _____
 Distance to adjacent ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3860	1630	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	995	420	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4139	1722	pcph

_____ Estimation of V12 Diverge
 Areas _____

$$L = \text{(Equation 25-8 or 25-9)}$$

$$EQ$$

$$P = 0.577 \text{ Using Equation 5}$$

$$FD$$

$$v = v + (v - v) P = 3117 \text{ pc/h}$$

$$12 \quad R \quad F \quad R \quad FD$$

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	4139	7050	No
$F_i \quad F$			
$v = v - v$	2417	7050	No
$FO \quad F \quad R$			
v	1722	2100	No
R			
$v \quad v$	1022 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v \quad v > 2700 \text{ pc/h?}$	No		
3 or av34			
Is $v \quad v > 1.5 \quad v / 2$	No		
3 or av34	12		
If yes, $v =$	(Equation 25-18)		
12A			

_____ Flow Entering Diverge Influence
 Area _____

v	Actual	Max Desirable	Violation?
12	3117	4600	No

_____ Level of Service Determination (if not F) _____

$$\text{Density, } D = 4.252 + 0.0086 \quad v - 0.009 \quad L = 28.4 \text{ pc/mi/ln}$$

$$R \quad 12 \quad D$$

Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, $D = 0.453$
 S

Space mean speed in ramp influence area, $S = 54.6$ mph

Space mean speed in outer lanes, $S = 71.2$ mph

Space mean speed for all vehicles, $S = 57.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Merge
Analysis _____

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 NB
Junction: Placer Parkway
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

_____ Freeway
Data _____

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2230	vph

_____ On Ramp
Data _____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	380	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	2230	380	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	575	98	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2391	402	pcph

_____ Estimation of V12 Merge
Areas _____

L = _____ (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 2391$ pc/h
12 F FM

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
v	2793	4700	No
FO			
v v	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
Area _____

	Actual	Max Desirable	Violation?
v	2391	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 23.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

_____ Speed
Estimation _____

Intermediate speed variable, M = 0.340
S
Space mean speed in ramp influence area, S = 57.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0

Space mean speed for all vehicles, $S = 57.2$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 NB
From/To: North of Sankey Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 2610 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 673 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 1399 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 1399 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 65.0 mi/h
Number of lanes, N 2
Density, D 21.5 pc/mi/ln
Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 SB
From/To: North of Sankey Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 1600 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 412 v
Trucks and buses 12 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.943
Driver population factor, fp 1.00
Flow rate, vp 874 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 874 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 65.0 mi/h
Number of lanes, N 2
Density, D 13.4 pc/mi/ln
Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak
 Freeway/Dir of Travel: SR-99 SB
 Junction: Placer Parkway
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 1600 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 220 vph
 Length of first accel/decel lane 300 ft
 Length of second accel/decel lane ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp vph
 Position of adjacent ramp
 Type of adjacent ramp
 Distance to adjacent ramp ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1600	220	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	412	57	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1748	232	pcph

_____ Estimation of V12 Diverge
 Areas _____

$$L = \text{(Equation 25-8 or 25-9)}$$

$$EQ$$

$$P = 1.000 \text{ Using Equation 0}$$

$$FD$$

$$v = v + (v - v) P = 1748 \text{ pc/h}$$

$$12 \quad R \quad F \quad R \quad FD$$

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	1748	4700	No
$F_i \quad F$			
$v = v - v$	1516	4700	No
$FO \quad F \quad R$			
v	232	2100	No
R			
$v \quad v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v \quad v > 2700 \text{ pc/h?}$		No	
3 or av34			
Is $v \quad v > 1.5 \quad v / 2$		No	
3 or av34	12		
If yes, $v =$		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	1748	4600	No
12			!

_____ Level of Service Determination (if not F) _____

$$\text{Density, } D = 4.252 + 0.0086 \quad v - 0.009 \quad L = 16.6 \text{ pc/mi/ln}$$

$$R \quad 12 \quad D$$

Level of service for ramp-freeway junction areas of influence B

_____ Speed
 Estimation _____

Intermediate speed variable, $D = 0.319$
 S

Space mean speed in ramp influence area, $S = 57.7$ mph

Space mean speed in outer lanes, $S = \text{N/A}$ mph

Space mean speed for all vehicles, $S = 57.7$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: SR-99 SB
 Junction: Placer Parkway
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 966 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 45.0 mph
 Volume on ramp 1280 vph
 Length of first accel/decel lane 500 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp _____ vph
 Position of adjacent Ramp _____
 Type of adjacent Ramp _____
 Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	966	1280	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	249	330	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1056	1353	pcph

_____ Estimation of V12 Merge
 Areas _____

L = _____ (Equation 25-2 or 25-3)
 EQ
 P = 1.000 Using Equation 0
 FM
 $v = v (P) = 1056$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	2409	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	1056	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 20.5$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence C

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.319
 S
 Space mean speed in ramp influence area, S = 57.7 mph
 R
 Space mean speed in outer lanes, S = N/A mph
 0

Space mean speed for all vehicles, $S = 57.7$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 SB
From/To: Sankey Road to Riego Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 1862 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 480 v
Trucks and buses 12 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.943
Driver population factor, fp 1.00
Flow rate, vp 1017 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 1017 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 65.0 mi/h
Number of lanes, N 2
Density, D 15.6 pc/mi/ln
Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak
 Freeway/Dir of Travel: SR-99 SB
 Junction: Riego
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 1862 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 2
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 790 vph
 Length of first accel/decel lane 0 ft
 Length of second accel/decel lane 1000 ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp _____ vph
 Position of adjacent ramp _____
 Type of adjacent ramp _____
 Distance to adjacent ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1862	790	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	480	204	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2035	835	pcph

_____ Estimation of V12 Diverge
 Areas _____

$$L = \text{(Equation 25-8 or 25-9)}$$

$$EQ$$

$$P = 1.000 \text{ Using Equation 0}$$

$$FD$$

$$v = v + (v - v) P = 2035 \text{ pc/h}$$

$$12 \quad R \quad F \quad R \quad FD$$

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	2035	4700	No
$F_i \quad F$			
$v = v - v$	1200	4700	No
$FO \quad F \quad R$			
v	835	4100	No
R			
$v \quad v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v \quad v > 2700 \text{ pc/h?}$		No	
3 or av34			
Is $v \quad v > 1.5 \quad v / 2$		No	
3 or av34	12		
If yes, $v =$		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

v	Actual	Max Desirable	Violation?
12	2035	4600	No

_____ Level of Service Determination (if not F) _____

$$\text{Density, } D = 4.252 + 0.0086 \quad v - 0.009 \quad L = 12.8 \text{ pc/mi/ln}$$

$$R \quad 12 \quad D$$

Level of service for ramp-freeway junction areas of influence B

_____ Speed
 Estimation _____

$$\text{Intermediate speed variable, } S \quad D = 0.373$$

Space mean speed in ramp influence area, $S = 56.4$ mph

Space mean speed in outer lanes, $S = N/A$ mph

Space mean speed for all vehicles, $S = 56.4$ mph

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: SR-99 SB
 Junction: Riego DiagOn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 3
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3299 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 45.0 mph
 Volume on ramp 1730 vph
 Length of first accel/decel lane 140 ft
 Length of second accel/decel lane ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp vph
 Position of adjacent Ramp
 Type of adjacent Ramp
 Distance to adjacent Ramp ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3299	1730	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	850	446	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3605	1828	pcph

_____ Estimation of V12 Merge
 Areas _____

L = (Equation 25-2 or 25-3)
 EQ
 P = 0.581 Using Equation 1
 FM
 $v = v (P) = 2096$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	5433	7050	No
FO			
v v	1509 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	2096	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 34.4$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.506
 S
 Space mean speed in ramp influence area, S = 53.4 mph
 R
 Space mean speed in outer lanes, S = 61.4 mph
 0

Space mean speed for all vehicles, $S = 55.4$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 SB
From/To: Riego Road to Elverta Road
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 3913 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 1009 v
Trucks and buses 12 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.943
Driver population factor, fp 1.00
Flow rate, vp 2138 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 2138 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 58.6 mi/h
Number of lanes, N 2
Density, D 36.5 pc/mi/ln
Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak
 Freeway/Dir of Travel: SR-99 SB
 Junction: Elverta
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3913 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 580 vph
 Length of first accel/decel lane 300 ft
 Length of second accel/decel lane ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp vph
 Position of adjacent ramp
 Type of adjacent ramp
 Distance to adjacent ramp ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3913	580	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	1009	149	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4276	613	pcph

_____ Estimation of V12 Diverge
 Areas _____

L = (Equation 25-8 or 25-9)
 EQ
 P = 1.000 Using Equation 0
 FD
 $v = v + (v - v) P = 4276$ pc/h
 12 R F R FD

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	4276	4700	No
$F_i F$			
$v = v - v$	3663	4700	No
$FO F R$			
v	613	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, $v =$		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	4276	4600	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 4.252 + 0.0086 v - 0.009 L = 38.3$ pc/mi/ln
 R 12 D
 Level of service for ramp-freeway junction areas of influence E

_____ Speed
 Estimation _____

Intermediate speed variable, $D = 0.353$
 S

Space mean speed in ramp influence area, $S = 56.9$ mph

Space mean speed in outer lanes, $S = N/A$ mph

Space mean speed for all vehicles, $S = 56.9$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: SR-99 SB
 Junction: Elverta
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3507 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 25.0 mph
 Volume on ramp 360 vph
 Length of first accel/decel lane 500 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp _____ vph
 Position of adjacent Ramp _____
 Type of adjacent Ramp _____
 Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3507	360	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	904	93	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3832	380	pcph

_____ Estimation of V12 Merge
 Areas _____

L = _____ (Equation 25-2 or 25-3)
 EQ
 P = 1.000 Using Equation 0
 FM
 $v = v (P) = 3832$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	4212	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	3832	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 35.0+$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence E

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.559
 S
 Space mean speed in ramp influence area, S = 52.1 mph
 R
 Space mean speed in outer lanes, S = N/A mph
 0

Space mean speed for all vehicles, $S = 52.1$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Merge
Analysis _____

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR-99 SB
Junction: Elverta
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

_____ Freeway
Data _____

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3759 vph

_____ On Ramp
Data _____

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 45.0 mph
Volume on ramp 330 vph
Length of first accel/decel lane 500 ft
Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
Volume on adjacent Ramp _____ vph
Position of adjacent Ramp _____
Type of adjacent Ramp _____
Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3759	330	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	969	85	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4108	349	pcph

_____ Estimation of V12 Merge
Areas _____

L = _____ (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 4108$ pc/h
12 F FM

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
v	4457	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
Area _____

	Actual	Max Desirable	Violation?
v	4108	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 36.9$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence E

_____ Speed
Estimation _____

Intermediate speed variable, M = 0.612
S
Space mean speed in ramp influence area, S = 50.9 mph
R
Space mean speed in outer lanes, S = N/A mph
0

Space mean speed for all vehicles, $S = 50.9$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 SB
From/To: Elverta Road to Elkhorn Blvd
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 3990 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 1028 v
Trucks and buses 12 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.943
Driver population factor, fp 1.00
Flow rate, vp 2180 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 2180 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 57.6 mi/h
Number of lanes, N 2
Density, D 37.9 pc/mi/ln
Level of service, LOS E

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak
 Freeway/Dir of Travel: SR-99 SB
 Junction: Elkhorn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3990 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 1070 vph
 Length of first accel/decel lane 1000 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp _____ vph
 Position of adjacent ramp _____
 Type of adjacent ramp _____
 Distance to adjacent ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3990	1070	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	1028	276	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4360	1131	pcph

_____ Estimation of V12 Diverge
 Areas _____

L = _____ (Equation 25-8 or 25-9)
 EQ
 P = 1.000 Using Equation 0
 FD
 $v = v + (v - v) P = 4360$ pc/h
 12 R F R FD

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	4360	4700	No
Fi F			
$v = v - v$	3229	4700	No
FO F R			
v	1131	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

v	Actual	Max Desirable	Violation?
12	4360	4600	No

_____ Level of Service Determination (if not F) _____

Density, $D = 4.252 + 0.0086 v - 0.009 L = 32.7$ pc/mi/ln
 R 12 D
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, $D = 0.400$
 S

Space mean speed in ramp influence area, $S = 55.8$ mph

Space mean speed in outer lanes, $S = N/A$ mph

Space mean speed for all vehicles, $S = 55.8$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: SR-99 SB
 Junction: Elkhorn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3241 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 25.0 mph
 Volume on ramp 370 vph
 Length of first accel/decel lane 500 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp _____ vph
 Position of adjacent Ramp _____
 Type of adjacent Ramp _____
 Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3241	370	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	835	95	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3542	391	pcph

_____ Estimation of V12 Merge
 Areas _____

L = _____ (Equation 25-2 or 25-3)
 EQ
 P = 1.000 Using Equation 0
 FM
 $v = v (P) = 3542$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	3933	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	3542	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 32.8$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.495
 S
 Space mean speed in ramp influence area, S = 53.6 mph
 R
 Space mean speed in outer lanes, S = N/A mph
 0

Space mean speed for all vehicles, $S = 53.6$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak Hour
 Freeway/Dir of Travel: SR-99 SB
 Junction: Elkhorn
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Merge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 3500 vph

_____ On Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-flow speed on ramp 45.0 mph
 Volume on ramp 110 vph
 Length of first accel/decel lane 500 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent Ramp _____ vph
 Position of adjacent Ramp _____
 Type of adjacent Ramp _____
 Distance to adjacent Ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	3500	110	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	902	28	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3825	116	pcph

_____ Estimation of V12 Merge
 Areas _____

L = _____ (Equation 25-2 or 25-3)
 EQ
 P = 1.000 Using Equation 0
 FM
 $v = v (P) = 3825$ pc/h
 12 F FM

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
v	3941	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
 Area _____

	Actual	Max Desirable	Violation?
v	3825	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 33.0$ pc/mi/ln
 R R 12 A
 Level of service for ramp-freeway junction areas of influence D

_____ Speed
 Estimation _____

Intermediate speed variable, M = 0.477
 S
 Space mean speed in ramp influence area, S = 54.0 mph
 R
 Space mean speed in outer lanes, S = N/A mph
 0

Space mean speed for all vehicles, $S = 54.0$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 SB
From/To: Elkhorn Blvd to I-5
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 3577 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 922 v
Trucks and buses 12 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.943
Driver population factor, fp 1.00
Flow rate, vp 1954 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 1954 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 62.2 mi/h
Number of lanes, N 2
Density, D 31.4 pc/mi/ln
Level of service, LOS D

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak
Freeway/Direction: Placer Parkway EB
From/To: SR 99 to Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 1850 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 477 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 992 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 992 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 65.0 mi/h
Number of lanes, N 2
Density, D 15.3 pc/mi/ln
Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
 E-mail: _____

_____ Diverge
 Analysis _____

Analyst: JMO
 Agency/Co.: Fehr and Peers
 Date performed: 5/19/08
 Analysis time period: PM Peak
 Freeway/Dir of Travel: Placer Parkway EB
 Junction: Road C
 Jurisdiction: Sutter County
 Analysis Year: Cumulative PP PP w/ Mit
 Description: South Sutter

_____ Freeway
 Data _____

Type of analysis Diverge
 Number of lanes in freeway 2
 Free-flow speed on freeway 65.0 mph
 Volume on freeway 1850 vph

_____ Off Ramp
 Data _____

Side of freeway Right
 Number of lanes in ramp 1
 Free-Flow speed on ramp 45.0 mph
 Volume on ramp 720 vph
 Length of first accel/decel lane 1000 ft
 Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
 Volume on adjacent ramp _____ vph
 Position of adjacent ramp _____
 Type of adjacent ramp _____
 Distance to adjacent ramp _____ ft

_____ Conversion to pc/h Under Base
 Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1850	720	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	477	186	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1984	761	pcph

_____ Estimation of V12 Diverge
 Areas _____

L = _____ (Equation 25-8 or 25-9)
 EQ
 P = 1.000 Using Equation 0
 FD
 $v = v + (v - v) P = 1984$ pc/h
 12 R F R FD

_____ Capacity
 Checks _____

	Actual	Maximum	LOS F?
$v = v$	1984	4700	No
Fi F			
$v = v - v$	1223	4700	No
FO F R			
v	761	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
 Area _____

v	Actual	Max Desirable	Violation?
12	1984	4600	No

_____ Level of Service Determination (if not F) _____

Density, $D = 4.252 + 0.0086 v - 0.009 L = 12.3$ pc/mi/ln
 R 12 D
 Level of service for ramp-freeway junction areas of influence B

_____ Speed
 Estimation _____

Intermediate speed variable, $D = 0.366$
 S

Space mean speed in ramp influence area, $S = 56.6$ mph

Space mean speed in outer lanes, $S = N/A$ mph

Space mean speed for all vehicles, $S = 56.6$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Merge
Analysis _____

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: Placer Parkway EB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

_____ Freeway
Data _____

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1130	vph

_____ On Ramp
Data _____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	1430	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	1130	1430	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	291	369	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET		1.5	1.5
Recreational vehicle PCE, ER		1.2	1.2
Heavy vehicle adjustment, fHV		0.962	0.976
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1212	1511	pcph

_____ Estimation of V12 Merge
Areas _____

L = _____ (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 1212 \text{ pc/h}$
12 F FM

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
v	2723	4700	No
FO			
v v	0 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
Area _____

	Actual	Max Desirable	Violation?
v	1212	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 19.7 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence B

_____ Speed
Estimation _____

Intermediate speed variable, M = 0.290
S
Space mean speed in ramp influence area, S = 58.3 mph
R
Space mean speed in outer lanes, S = N/A mph
0

Space mean speed for all vehicles, $S = 58.3$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak
Freeway/Direction: Placer Parkway EB
From/To: East of Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 2560 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 660 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 1372 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 1372 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 65.0 mi/h
Number of lanes, N 2
Density, D 21.1 pc/mi/ln
Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak
Freeway/Direction: Placer Parkway WB
From/To: East of Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 1390 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 358 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 745 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 745 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 65.0 mi/h
Number of lanes, N 2
Density, D 11.5 pc/mi/ln
Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Diverge
Analysis _____

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: Placer Parkway WB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

_____ Freeway
Data _____

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 1390 vph

_____ Off Ramp
Data _____

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 710 vph
Length of first accel/decel lane 1000 ft
Length of second accel/decel lane _____ ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist? No
Volume on adjacent ramp _____ vph
Position of adjacent ramp _____
Type of adjacent ramp _____
Distance to adjacent ramp _____ ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	1390	710	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	358	183	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%
Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1490	750	pcph

_____ Estimation of V12 Diverge
Areas _____

L = _____ (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 1490$ pc/h
12 R F R FD

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
$v = v$	1490	4700	No
Fi F			
$v = v - v$	740	4700	No
FO F R			
v	750	2100	No
R			
$v v$	0 pc/h	(Equation 25-15 or 25-16)	
3 or av34			
Is $v v > 2700$ pc/h?		No	
3 or av34			
Is $v v > 1.5 v / 2$		No	
3 or av34	12		
If yes, v =		(Equation 25-18)	
12A			

_____ Flow Entering Diverge Influence
Area _____

v	Actual	Max Desirable	Violation?
12	1490	4600	No

_____ Level of Service Determination (if not F) _____

Density, $D = 4.252 + 0.0086 v - 0.009 L = 8.1$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence A

_____ Speed
Estimation _____

Intermediate speed variable, $D = 0.366$
S

Space mean speed in ramp influence area, $S = 56.6$ mph

Space mean speed in outer lanes, $S = N/A$ mph

Space mean speed for all vehicles, $S = 56.6$ mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: _____ Fax: _____
E-mail: _____

_____ Merge
Analysis _____

Analyst: JMO
Agency/Co.: Fehr and Peers
Date performed: 5/19/08
Analysis time period: PM Peak
Freeway/Dir of Travel: Placer Parkway WB
Junction: Road C
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

_____ Freeway
Data _____

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	680	vph

_____ On Ramp
Data _____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	45.0	mph
Volume on ramp	980	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

_____ Conversion to pc/h Under Base
Conditions _____

Junction Components	Freeway	Ramp	Adjacent
		Ramp	
Volume, V (vph)	680	980	vph
Peak-hour factor, PHF	0.97	0.97	

Peak 15-min volume, v15	175	253	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	729	1036	pcph

_____ Estimation of V12 Merge
Areas _____

L = _____ (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v = v (P) = 729$ pc/h
12 F FM

_____ Capacity
Checks _____

	Actual	Maximum	LOS F?
v	1765	4700	No
FO			
v v	0	pc/h	(Equation 25-4 or 25-5)
3 or av34			
Is v v > 2700 pc/h?		No	
3 or av34			
Is v v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

_____ Flow Entering Merge Influence
Area _____

	Actual	Max Desirable	Violation?
v	729	4400	No
12			!

_____ Level of Service Determination (if not F) _____

Density, D = $5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 12.5$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

_____ Speed
Estimation _____

Intermediate speed variable, M = 0.254
S
Space mean speed in ramp influence area, S = 59.2 mph
R
Space mean speed in outer lanes, S = N/A mph
0

Space mean speed for all vehicles, $S = 59.2$ mph

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak
Freeway/Direction: Placer Parkway WB
From/To: Road C to SR 99
Jurisdiction: Sutter County
Analysis Year: Cumulative PP PP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 1660 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 428 v
Trucks and buses 8 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.962
Driver population factor, fp 1.00
Flow rate, vp 890 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 2
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 4.5 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance
Measures

Flow rate, vp 890 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 65.0 mi/h
Number of lanes, N 2
Density, D 13.7 pc/mi/ln
Level of service, LOS B

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational
Analysis

Analyst: JMO
Agency or Company: Fehr and Peers
Date Performed: 5/19/08
Analysis Time Period: PM Peak Period
Freeway/Direction: SR 99 SB
From/To: Mainline after Riego Loop On
Jurisdiction: Sutter County
Analysis Year: Cumulative PP WPP w/ Mit
Description: South Sutter

Flow Inputs and
Adjustments

Volume, V 3299 veh/h
Peak-hour factor, PHF 0.97
Peak 15-min volume, v15 850 v
Trucks and buses 12 %
Recreational vehicles 0 %
Terrain type: Level
Grade 0.00 %
Segment length 0.00 mi
Trucks and buses PCE, ET 1.5
Recreational vehicle PCE, ER 1.2
Heavy vehicle adjustment, fHV 0.943
Driver population factor, fp 1.00
Flow rate, vp 1202 pc/h/ln

Speed Inputs and
Adjustments

Lane width 12.0 ft
Right-shoulder lateral clearance 6.0 ft
Interchange density 0.50 interchange/mi
Number of lanes, N 3
Free-flow speed: Measured
FFS or BFFS 65.0 mi/h
Lane width adjustment, fLW 0.0 mi/h
Lateral clearance adjustment, fLC 0.0 mi/h
Interchange density adjustment, fID 0.0 mi/h
Number of lanes adjustment, fN 3.0 mi/h
Free-flow speed, FFS 65.0 mi/h

Urban Freeway

LOS and Performance

Measures

Flow rate, vp 1202 pc/h/ln
Free-flow speed, FFS 65.0 mi/h
Average passenger-car speed, S 65.0 mi/h
Number of lanes, N 3
Density, D 18.5 pc/mi/ln
Level of service, LOS C

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB SR-99
Junction: NB I-5 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 65.0 mph
Volume on freeway 3908 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1105 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3908	1105	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1007	285	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4271	1168	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v = v + (v - v) P = 4271$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	4271	4700	No
Fi F			
v	4271	4400	No
12			
v = v - v	3103	4700	No
FO F R			
v	1168	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 27.5$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.143$
S
Space mean speed in ramp influence area, $S = 61.7$ mph
R
Space mean speed in outer lanes, $S = N/A$ mph
0
Space mean speed for all vehicles, $S = 61.7$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB I-5
Junction: SB SR-99 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Merge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 3835 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 65.0 mph
Volume on ramp 1105 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
Volume, V (vph)	3835	1105	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	988	285	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4112	1168	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2547 \text{ pc/h}$
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5280	7050	No
FO			
v	3715	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 24.5 \text{ pc/mi/ln}$
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.286
S
Space mean speed in ramp influence area, S = 58.4 mph
R
Space mean speed in outer lanes, S = 61.2 mph
0
Space mean speed for all vehicles, S = 59.2 mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SB I-5
Junction: NB SR-99 Diverge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP Plus Mit
Description: South Sutter Co.

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 65.0 mph
Volume on freeway 4980 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 65.0 mph
Volume on ramp 1165 vph
Length of first accel/decel lane 1500 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	4980	1165	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1284	300	v
Trucks and buses	12	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00 %	0.00 %	%

Length	0.00 mi	0.00 mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.943	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5442	1231	pcph

Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
EQ
P = 0.567 Using Equation 5
FD
 $v = v + (v - v) P = 3620$ pc/h
12 R F R FD

Capacity Checks

	Actual	Maximum	LOS F?
v = v	5442	7050	No
Fi F			
v	3620	4400	No
12			
v = v - v	4211	7050	No
FO F R			
v	1231	2200	No
R			

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v - 0.009 L = 21.9$ pc/mi/ln
R 12 D
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, $D = 0.149$
S
Space mean speed in ramp influence area, $S = 61.6$ mph
R
Space mean speed in outer lanes, $S = 68.1$ mph
0
Space mean speed for all vehicles, $S = 63.6$ mph

HCS+: Ramps and Ramp Junctions Release 5.2

Phone: Fax:
E-mail:

Merge Analysis

Analyst: KS
Agency/Co.: Fehr & Peers
Date performed: 8/28/2007
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: NB SR-99
Junction: SB I-5 Merge
Jurisdiction: Sutter Co.
Analysis Year: Cumulative PP WPP
Description: South Sutter Co.

Freeway Data

Type of analysis	Merge
Number of lanes in freeway	3
Free-flow speed on freeway	65.0 mph
Volume on freeway	4293 vph

On Ramp Data

Side of freeway	Right
Number of lanes in ramp	1
Free-flow speed on ramp	65.0 mph
Volume on ramp	1165 vph
Length of first accel/decel lane	1500 ft
Length of second accel/decel lane	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent Ramp vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent
	Ramp		
Volume, V (vph)	4293	1165	vph
Peak-hour factor, PHF	0.97	0.97	
Peak 15-min volume, v15	1106	300	v
Trucks and buses	8	5	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%

Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	
Heavy vehicle adjustment, fHV	0.962	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4603	1231	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.619 Using Equation 1
FM
 $v = v(P) = 2852$ pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	5834	7050	No
FO			
v	4083	4600	No
R12			

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 27.4$ pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.357
S
Space mean speed in ramp influence area, S = 56.8 mph
R
Space mean speed in outer lanes, S = 60.5 mph
0
Space mean speed for all vehicles, S = 57.8 mph

Leisch Method for Weaving Analysis

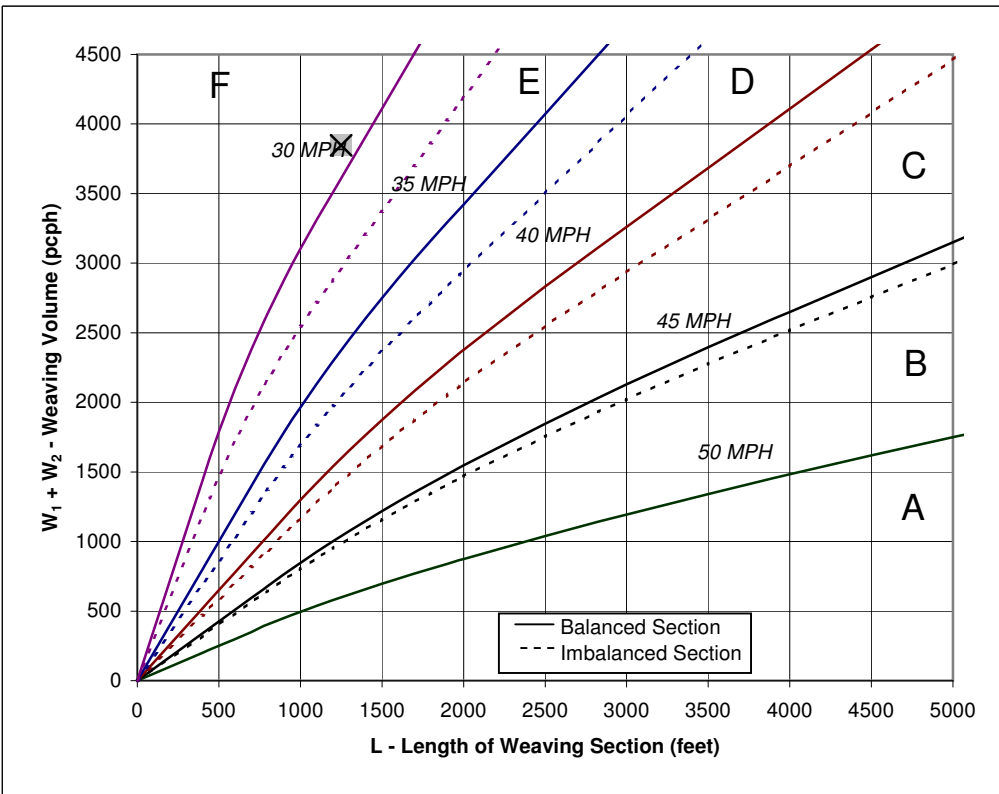
Data Input

Number of Entering Mainline Lanes	N_b	2
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	1,250

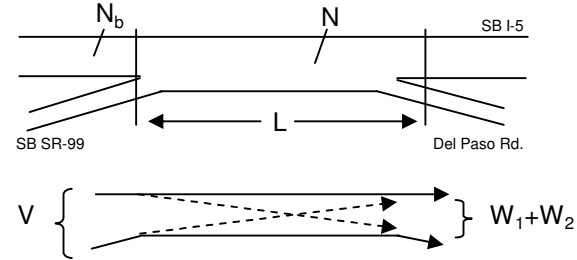
Project Information

Project	South Sutter County
Scenario	Cumulative PP WPP - PM
Freeway	SB I-5
On-ramp	SB SR-99
Off-ramp	Del Paso Rd.

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,618	Volume (vph)*	2,803	Volume (vph)*	950
Truck Percentage	12%	Truck Percentage	5%	Truck Percentage	5%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	7,015	Volume (pcph)	2,873	Volume (pcph)	974



Figure



Capacity Analysis

- Is the weaving section balanced (Y / N)? **N**
[If optional exit lane, then "Y". Otherwise "N".]
- In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
30 MPH and **35 MPH**
If below the 50 MPH curve, out of the realm of weaving.
If left of the 30 MPH curve, LOS is F.
- Interpolated Weaving Speed (S_w , mph) **25.2**
- Weaving Intensity Factor (k) **3.00**
- Service Volume (SV, pcph)
 $SV = (1/N) * [V + (k - 1) * \min(W_1, W_2)]$ **2,241**
- Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

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

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCM Methodology for Major Diverge

Data Input

		Default?
Peak Hour Volume (veh/hr):	7450	n/a
PHF:	0.97	0.92
% Trucks & Buses (decimal)	0.08	n/a
E_T	1.5	1.5
% Rec. Vehicles (decimal)	0.00	n/a
E_R	1.2	1.2
f_P (driver pop'n adjustment)	1.00	1.00
Number of Lanes	3	n/a

	Entering	Departing
Volume	7450	4293
Lanes	3	2
Capacity Check	LOS F	OK

f_{HV}	0.9615
----------------------------	--------

v_i	7987.629	pc/hr/ln
-------------------------	----------	----------

Density, D	29.0	pc/mi/ln
-------------------	------	----------

LOS	LOS F
------------	-------

*LOS E or *** should be confirmed vs. capacity

Project Information

Project:	Sutter Pointe EIR
Scenario:	Cumulative PP WPP AM
Freeway Upstream:	I-5 NB
Downstream 1:	I-5 NB
Downstream 2:	SR 99 NB

*The following diverge analysis is designed based on pg. 25-17 of the 2000 HCM and is meant for use to calculate the density across all freeway lanes to be estimated for a distance of 1,500 feet upstream of the gore area.

LOS		Density (Low)		Density (High)
A	<	10	<	
B	>	10	<	20
C	>	20	<	28
D	>	28	<	35
E	>	35		
F	>	Capacity		

Factor	Type of Terrain		
	Level	Rolling	Mountainous
E _T	1.5	2.5	4.5
E _R	1.2	2.0	4.0

Factor	
f _P	Ranges from 0.85 to 1.00 (Commuter)
*Sufficient evidence needed for <1.00	

Inputs:

Outputs

Reference:

