

# Idaho-Maryland Mine Project

SCH# 2020070378

## Draft Environmental Impact Report

Volume X of X (Appendix O [*Continued*])

Prepared for  
County of Nevada



**December 2021**

Prepared by



1501 SPORTS DRIVE, SUITE A, SACRAMENTO, CA 95834

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**APPENDIX O (*CONTINUED*)**

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Intersection	
Intersection Delay, s/veh	23.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	29	21	12	25	45	171	20	475	12	51	191	26
Future Vol, veh/h	29	21	12	25	45	171	20	475	12	51	191	26
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	23	13	27	48	184	22	511	13	55	205	28
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11.1	13.6	35.7	12.8
HCM LOS	B	B	E	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	10%	100%	0%
Vol Thru, %	0%	98%	34%	19%	0%	88%
Vol Right, %	0%	2%	19%	71%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	487	62	241	51	217
LT Vol	20	0	29	25	51	0
Through Vol	0	475	21	45	0	191
RT Vol	0	12	12	171	0	26
Lane Flow Rate	22	524	67	259	55	233
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.039	0.873	0.13	0.431	0.105	0.408
Departure Headway (Hd)	6.525	6	7.032	5.989	6.892	6.296
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	546	602	513	596	516	567
Service Time	4.297	3.771	5.032	4.086	4.684	4.087
HCM Lane V/C Ratio	0.04	0.87	0.131	0.435	0.107	0.411
HCM Control Delay	9.6	36.8	11.1	13.6	10.5	13.4
HCM Lane LOS	A	E	B	B	B	B
HCM 95th-tile Q	0.1	10	0.4	2.2	0.3	2

Intersection						
Int Delay, s/veh	6.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	110	160	263	381	141	97
Future Vol, veh/h	110	160	263	381	141	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	117	170	280	405	150	103

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	280	0	-	0	684 280
Stage 1	-	-	-	-	280 -
Stage 2	-	-	-	-	404 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1283	-	-	0	414 759
Stage 1	-	-	-	0	767 -
Stage 2	-	-	-	0	674 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1283	-	-	-	376 759
Mov Cap-2 Maneuver	-	-	-	-	376 -
Stage 1	-	-	-	-	697 -
Stage 2	-	-	-	-	674 -

Approach	EB	WB	SB
HCM Control Delay, s	3.3	0	16.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1283	-	-	376	759
HCM Lane V/C Ratio	0.091	-	-	0.399	0.136
HCM Control Delay (s)	8.1	-	-	20.8	10.5
HCM Lane LOS	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	1.9	0.5

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	507	228	0
Future Vol, veh/h	0	0	0	507	228	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	528	238	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	766	238	238	0	-	0
Stage 1	238	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	371	801	1329	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	371	801	1329	-	-	-
Mov Cap-2 Maneuver	531	-	-	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	592	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1329	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	62	0	0	91	0	0
Future Vol, veh/h	62	0	0	91	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	0	0	99	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	67	0	166
Stage 1	-	-	-	-	67
Stage 2	-	-	-	-	99
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1535	-	824
Stage 1	-	-	-	-	956
Stage 2	-	-	-	-	925
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1535	-	824
Mov Cap-2 Maneuver	-	-	-	-	824
Stage 1	-	-	-	-	956
Stage 2	-	-	-	-	925

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1535	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	306	0	0	103	0	0	0	0	2	0	0
Future Vol, veh/h	0	306	0	0	103	0	0	0	0	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	364	0	0	123	0	0	0	0	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	123	0	0	364	0	0	487	487	364	487	487	123
Stage 1	-	-	-	-	-	-	364	364	-	123	123	-
Stage 2	-	-	-	-	-	-	123	123	-	364	364	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1464	-	-	1195	-	-	491	481	681	491	481	928
Stage 1	-	-	-	-	-	-	655	624	-	881	794	-
Stage 2	-	-	-	-	-	-	881	794	-	655	624	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1464	-	-	1195	-	-	491	481	681	491	481	928
Mov Cap-2 Maneuver	-	-	-	-	-	-	491	481	-	491	481	-
Stage 1	-	-	-	-	-	-	655	624	-	881	794	-
Stage 2	-	-	-	-	-	-	881	794	-	655	624	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			0			12.4		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1464	-	-	1195	-	-	491
HCM Lane V/C Ratio	-	-	-	-	-	-	-	0.005
HCM Control Delay (s)	0	0	-	-	0	-	-	12.4
HCM Lane LOS		A	A	-	-	A	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	200	232	21	180	71	11
Future Vol, veh/h	200	232	21	180	71	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	206	239	22	186	73	11

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	445	0	436	206
Stage 1	-	-	-	-	206	-
Stage 2	-	-	-	-	230	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1115	-	578	835
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	808	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1115	-	566	835
Mov Cap-2 Maneuver	-	-	-	-	566	-
Stage 1	-	-	-	-	829	-
Stage 2	-	-	-	-	792	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	12.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	592	-	-	1115	-
HCM Lane V/C Ratio	0.143	-	-	0.019	-
HCM Control Delay (s)	12.1	-	-	8.3	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↗		↖	↗
Traffic Vol, veh/h	100	101	101	88	38	94
Future Vol, veh/h	100	101	101	88	38	94
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	118	119	119	104	45	111
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	9.8	8.9	8.7
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	50%	0%	100%	0%
Vol Thru, %	50%	53%	0%	0%
Vol Right, %	0%	47%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	201	189	38	94
LT Vol	100	0	38	0
Through Vol	101	101	0	0
RT Vol	0	88	0	94
Lane Flow Rate	236	222	45	111
Geometry Grp	2	2	7	7
Degree of Util (X)	0.306	0.267	0.075	0.149
Departure Headway (Hd)	4.663	4.32	6.061	4.851
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	771	832	590	737
Service Time	2.697	2.352	3.807	2.597
HCM Lane V/C Ratio	0.306	0.267	0.076	0.151
HCM Control Delay	9.8	8.9	9.3	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.3	1.1	0.2	0.5

**Intersection**

Intersection Delay, s/veh	8.8
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	91	52	84	84	84	71
Future Vol, veh/h	91	52	84	84	84	71
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	58	93	93	93	79
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.9	9.3	8.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	50%	64%	0%	0%
Vol Thru, %	50%	0%	100%	0%
Vol Right, %	0%	36%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	168	143	84	71
LT Vol	84	91	0	0
Through Vol	84	0	84	0
RT Vol	0	52	0	71
Lane Flow Rate	187	159	93	79
Geometry Grp	5	2	7	7
Degree of Util (X)	0.244	0.206	0.132	0.096
Departure Headway (Hd)	4.713	4.668	5.084	4.379
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	762	769	706	818
Service Time	2.741	2.695	2.811	2.106
HCM Lane V/C Ratio	0.245	0.207	0.132	0.097
HCM Control Delay	9.3	8.9	8.6	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1	0.8	0.5	0.3



Queues  
24: Brunswick Rd & Loma Rica Dr

Existing AM Peak  
01/21/2021















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	59	197	587	147	299	233
v/c Ratio	0.25	0.29	0.78	0.20	0.66	0.15
Control Delay	31.8	5.8	26.3	3.9	30.6	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	5.8	26.3	3.9	30.6	2.9
Queue Length 50th (ft)	24	14	213	0	120	23
Queue Length 95th (ft)	59	50	#422	33	212	49
Internal Link Dist (ft)	770		615			753
Turn Bay Length (ft)	165			405	410	
Base Capacity (vph)	451	816	1017	929	636	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.24	0.58	0.16	0.47	0.15

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Existing AM Peak  
 01/21/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	181	540	135	275	214
Future Volume (veh/h)	54	181	540	135	275	214
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	59	197	587	147	299	233
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	236	531	697	591	361	1238
Arrive On Green	0.14	0.14	0.38	0.38	0.21	0.68
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	59	197	587	147	299	233
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	1.7	5.5	16.8	3.7	9.5	2.7
Cycle Q Clear(g_c), s	1.7	5.5	16.8	3.7	9.5	2.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	236	531	697	591	361	1238
V/C Ratio(X)	0.25	0.37	0.84	0.25	0.83	0.19
Avail Cap(c_a), veh/h	427	701	960	813	602	1564
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.2	14.2	16.2	12.1	21.8	3.4
Incr Delay (d2), s/veh	0.5	0.4	5.0	0.2	4.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.8	6.4	1.1	3.8	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.7	14.6	21.2	12.4	26.7	3.5
LnGrp LOS	C	B	C	B	C	A
Approach Vol, veh/h	256		734			532
Approach Delay, s/veh	16.5		19.5			16.5
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	17.0	27.7			44.7	12.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	11.5	18.8			4.7	7.5
Green Ext Time (p_c), s	0.6	3.1			1.3	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			17.9			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	9.1	28.6	6.4	14.5

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.3	0.0	0.6
Total Del/Veh (s)	5.4	9.1	16.5	10.4

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.2
Total Del/Veh (s)	8.4	9.2	1.2	6.2

8: Main St & Maltman Dr/Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.6	1.8	1.0
Total Del/Veh (s)	14.2	8.0	11.6	12.3	10.4

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.4	2.8	0.8
Total Del/Veh (s)	9.7	12.4	13.5	34.6	17.5

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.2	6.8	23.8	12.0

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.3
Total Del/Veh (s)	10.4	17.9	16.1	4.8	11.8

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	1.0	0.6
Total Del/Veh (s)	15.2	17.0	10.2	12.6

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.8	0.0	0.1	0.5
Total Del/Veh (s)	8.1	5.1	8.7	6.5

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Total Zone Performance

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Denied Del/Veh (s)	1.1
Total Del/Veh (s)	273.6

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	106	325	117	89
Average Queue (ft)	70	130	53	33
95th Queue (ft)	115	265	98	68
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	5			
Queuing Penalty (veh)	15			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	128	123	195	121	106
Average Queue (ft)	56	41	84	72	49
95th Queue (ft)	99	93	153	115	92
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			4	1
Queuing Penalty (veh)	1			6	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	8		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	114	108	35	80	28
Average Queue (ft)	62	51	11	42	2
95th Queue (ft)	96	83	35	65	13
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Maltman Dr/Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	T	R	L	L	T
Maximum Queue (ft)	44	107	113	121	139	101	79	137	123
Average Queue (ft)	19	42	51	48	59	40	27	64	51
95th Queue (ft)	44	82	91	95	107	76	63	111	100
Link Distance (ft)	777	160	160	160	1486				1622
Upstream Blk Time (%)		0	0	0					
Queuing Penalty (veh)		0	0	0					
Storage Bay Dist (ft)						115	360	360	
Storage Blk Time (%)					1	0			
Queuing Penalty (veh)					1	0			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	136	162	101	170	164	64	90	151	178	85	90
Average Queue (ft)	48	73	60	58	67	18	43	67	108	30	42
95th Queue (ft)	109	145	99	134	139	50	74	135	167	69	76
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	2	2						
Queuing Penalty (veh)	0	1	0	6	7						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	2		0	0				
Queuing Penalty (veh)			3	2		0	0				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	96	101	84	124	216	218	254
Average Queue (ft)	30	31	17	22	147	119	34
95th Queue (ft)	74	77	59	84	221	209	152
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)				0	14	7	
Queuing Penalty (veh)				0	0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	84	102	123	138	117	108	153	200	48	114	94	76
Average Queue (ft)	34	55	57	74	56	47	67	104	16	53	33	32
95th Queue (ft)	72	90	102	116	96	87	121	175	42	94	72	65
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280			280
Storage Blk Time (%)						0	1					
Queuing Penalty (veh)						0	1					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	77
Average Queue (ft)	32
95th Queue (ft)	66
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	131	118	34	63	77	94	252	84
Average Queue (ft)	48	49	5	25	32	16	114	16
95th Queue (ft)	99	98	21	51	61	59	204	55
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)	0							
Queuing Penalty (veh)	0							
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)							0	
Queuing Penalty (veh)							1	



Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	126	72	72	143	154	75	84
Average Queue (ft)	51	23	23	51	48	28	41
95th Queue (ft)	102	51	58	106	113	62	70
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				0			
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Zone Summary

Zone wide Queuing Penalty: 53

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

AM Peak  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	30	3.0	0.233	7.4	LOS A	1.0	25.5	0.60	0.58	0.60	33.5
8	T1	63	3.0	0.233	7.4	LOS A	1.0	25.5	0.60	0.58	0.60	33.4
18	R2	82	3.0	0.233	7.4	LOS A	1.0	25.5	0.60	0.58	0.60	32.5
Approach		176	3.0	0.233	7.4	LOS A	1.0	25.5	0.60	0.58	0.60	33.0
East: Idaho Maryland Rd												
1	L2	208	3.0	0.213	5.8	LOS A	0.9	22.9	0.48	0.39	0.48	32.2
6	T1	133	3.0	0.413	8.3	LOS A	2.1	53.0	0.57	0.50	0.57	33.4
16	R2	270	3.0	0.413	8.3	LOS A	2.1	53.0	0.57	0.50	0.57	32.3
Approach		611	3.0	0.413	7.4	LOS A	2.1	53.0	0.54	0.46	0.54	32.5
North: Main St												
7	L2	126	3.0	0.310	6.8	LOS A	1.3	34.3	0.49	0.42	0.49	33.2
4	T1	183	3.0	0.310	6.8	LOS A	1.3	34.3	0.49	0.42	0.49	33.2
14	R2	207	3.0	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		516	3.0	0.310	4.1	LOS A	1.3	34.3	0.29	0.25	0.29	34.6
West: Main St												
5	L2	276	3.0	0.499	10.6	LOS B	3.3	83.8	0.65	0.75	0.92	31.0
2	T1	148	3.0	0.499	10.6	LOS B	3.3	83.8	0.65	0.75	0.92	30.9
12	R2	14	3.0	0.499	10.6	LOS B	3.3	83.8	0.65	0.75	0.92	30.1
Approach		438	3.0	0.499	10.6	LOS B	3.3	83.8	0.65	0.75	0.92	30.9
All Vehicles		1740	3.0	0.499	7.2	LOS A	3.3	83.8	0.50	0.49	0.57	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\1-5 Exist\1.1 AM Peak Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	15.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	60	282	1	0	0	0	0	119	145	171	318	0
Future Vol, veh/h	60	282	1	0	0	0	0	119	145	171	318	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	313	1	0	0	0	0	132	161	190	353	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	13.8	15.3	16.5
HCM LOS	B	C	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	30%	0%	100%	0%
Vol Thru, %	45%	70%	99%	0%	100%
Vol Right, %	55%	0%	1%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	264	201	142	171	318
LT Vol	0	60	0	171	0
Through Vol	119	141	141	0	318
RT Vol	145	0	1	0	0
Lane Flow Rate	293	223	158	190	353
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.502	0.43	0.297	0.355	0.61
Departure Headway (Hd)	6.157	6.925	6.768	6.725	6.217
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	584	520	530	534	579
Service Time	4.207	4.678	4.521	4.477	3.969
HCM Lane V/C Ratio	0.502	0.429	0.298	0.356	0.61
HCM Control Delay	15.3	14.8	12.4	13.2	18.3
HCM Lane LOS	C	B	B	B	C
HCM 95th-tile Q	2.8	2.1	1.2	1.6	4.1

Intersection	
Intersection Delay, s/veh	23.8
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	186	37	56	689	169	195
Future Vol, veh/h	186	37	56	689	169	195
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	207	41	62	766	188	217
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	14.7	31.2	14.3
HCM LOS	B	D	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	20%	0%
Vol Thru, %	0%	0%	83%	80%	100%
Vol Right, %	0%	100%	17%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	169	195	223	286	459
LT Vol	169	0	0	56	0
Through Vol	0	0	186	230	459
RT Vol	0	195	37	0	0
Lane Flow Rate	188	217	248	317	510
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.401	0.389	0.447	0.561	0.888
Departure Headway (Hd)	7.69	6.467	6.492	6.361	6.261
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	468	555	555	565	577
Service Time	5.448	4.224	4.544	4.113	4.013
HCM Lane V/C Ratio	0.402	0.391	0.447	0.561	0.884
HCM Control Delay	15.5	13.3	14.7	17	40
HCM Lane LOS	C	B	B	C	E
HCM 95th-tile Q	1.9	1.8	2.3	3.4	10.4

<b>Intersection</b>						
Intersection Delay, s/veh	16.3					
Intersection LOS	C					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Vol, veh/h	365	72	23	629	93	30
Future Vol, veh/h	365	72	23	629	93	30
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	420	83	26	723	107	34
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	12.6	19.6	11.7
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	76%	0%	0%	10%	0%
Vol Thru, %	0%	100%	63%	90%	100%
Vol Right, %	24%	0%	37%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	243	194	233	419
LT Vol	93	0	0	23	0
Through Vol	0	243	122	210	419
RT Vol	30	0	72	0	0
Lane Flow Rate	141	280	223	267	482
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.253	0.46	0.35	0.422	0.754
Departure Headway (Hd)	6.443	5.92	5.656	5.678	5.628
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	558	610	637	634	646
Service Time	4.479	3.653	3.39	3.405	3.355
HCM Lane V/C Ratio	0.253	0.459	0.35	0.421	0.746
HCM Control Delay	11.7	13.6	11.4	12.5	23.6
HCM Lane LOS	B	B	B	B	C
HCM 95th-tile Q	1	2.4	1.6	2.1	6.8

Intersection												
Int Delay, s/veh	7.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↘		↗	↘	↗		↗	↖	↗
Traffic Vol, veh/h	0	0	196	23	0	72	234	460	52	90	445	14
Future Vol, veh/h	0	0	196	23	0	72	234	460	52	90	445	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	50	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	202	24	0	74	241	474	54	93	459	14

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	459	1736	-	501	473	0	0	528	0	0
Stage 1	-	-	-	983	-	-	-	-	-	-	-	-
Stage 2	-	-	-	753	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	7.12	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	6.12	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	3.518	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	602	69	0	570	1089	-	-	1039	-	-
Stage 1	0	0	-	299	0	-	-	-	-	-	-	-
Stage 2	0	0	-	402	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	-	602	36	-	570	1089	-	-	1039	-	-
Mov Cap-2 Maneuver	-	-	-	36	-	-	-	-	-	-	-	-
Stage 1	-	-	-	233	-	-	-	-	-	-	-	-
Stage 2	-	-	-	243	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14		61.8		2.9		1.4	
HCM LOS	B		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1089	-	-	602	36	570	1039	-	-
HCM Lane V/C Ratio	0.222	-	-	0.336	0.659	0.13	0.089	-	-
HCM Control Delay (s)	9.2	-	-	14	216.7	12.3	8.8	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	1.5	2.3	0.4	0.3	-	-

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Vol, veh/h	85	53	23	658	618	40
Future Vol, veh/h	85	53	23	658	618	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	56	24	693	651	42

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1413	347	693	0	-	0
Stage 1	672	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	140	650	900	-	-	-
Stage 1	470	-	-	-	-	-
Stage 2	470	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	136	650	900	-	-	-
Mov Cap-2 Maneuver	336	-	-	-	-	-
Stage 1	457	-	-	-	-	-
Stage 2	470	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.3	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	900	-	336	650	-	-
HCM Lane V/C Ratio	0.027	-	0.266	0.086	-	-
HCM Control Delay (s)	9.1	-	19.6	11.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	0.3	-	-

Intersection	
Intersection Delay, s/veh	19.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	18	21	19	24	37	75	9	311	34	138	483	30
Future Vol, veh/h	18	21	19	24	37	75	9	311	34	138	483	30
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	21	19	24	37	76	9	314	34	139	488	30
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	10.5	11.2	16.2	23.8
HCM LOS	B	B	C	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	31%	18%	100%	0%
Vol Thru, %	0%	90%	36%	27%	0%	94%
Vol Right, %	0%	10%	33%	55%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	345	58	136	138	513
LT Vol	9	0	18	24	138	0
Through Vol	0	311	21	37	0	483
RT Vol	0	34	19	75	0	30
Lane Flow Rate	9	348	59	137	139	518
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.016	0.573	0.108	0.237	0.238	0.804
Departure Headway (Hd)	6.499	5.921	6.623	6.217	6.134	5.587
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	550	610	538	576	585	648
Service Time	4.247	3.67	4.694	4.277	3.873	3.325
HCM Lane V/C Ratio	0.016	0.57	0.11	0.238	0.238	0.799
HCM Control Delay	9.4	16.4	10.5	11.2	10.8	27.3
HCM Lane LOS	A	C	B	B	B	D
HCM 95th-tile Q	0	3.6	0.4	0.9	0.9	8.1



Intersection						
Int Delay, s/veh	35.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	72	226	239	254	386	107
Future Vol, veh/h	72	226	239	254	386	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	78	246	260	276	420	116

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	260	0	-	0	662 260
Stage 1	-	-	-	-	260 -
Stage 2	-	-	-	-	402 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1304	-	-	0	427 779
Stage 1	-	-	-	0	783 -
Stage 2	-	-	-	0	676 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1304	-	-	-	~ 401 779
Mov Cap-2 Maneuver	-	-	-	-	~ 401 -
Stage 1	-	-	-	-	736 -
Stage 2	-	-	-	-	676 -

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	72.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1304	-	-	401	779
HCM Lane V/C Ratio	0.06	-	-	1.046	0.149
HCM Control Delay (s)	7.9	-	-	90.2	10.4
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	13.8	0.5

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	
Traffic Vol, veh/h	0	0	0	354	526	0
Future Vol, veh/h	0	0	0	354	526	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	385	572	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	957	572	572	0	-	0
Stage 1	572	-	-	-	-	-
Stage 2	385	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	286	520	1001	-	-	-
Stage 1	565	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	286	520	1001	-	-	-
Mov Cap-2 Maneuver	478	-	-	-	-	-
Stage 1	565	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1001	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	58	0	0	76	0	0
Future Vol, veh/h	58	0	0	76	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	0	0	83	0	0

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	63	0	146	63
Stage 1	-	-	-	-	63	-
Stage 2	-	-	-	-	83	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1540	-	846	1002
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	940	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1540	-	846	1002
Mov Cap-2 Maneuver	-	-	-	-	846	-
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	940	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1540	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	114	0	0	261	0	0	0	0	0	0	0
Future Vol, veh/h	1	114	0	0	261	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	152	0	0	348	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	348	0	0	152	0	0	508	508	152	508	508	348
Stage 1	-	-	-	-	-	-	160	160	-	348	348	-
Stage 2	-	-	-	-	-	-	348	348	-	160	160	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1211	-	-	1429	-	-	475	468	894	475	468	695
Stage 1	-	-	-	-	-	-	842	766	-	668	634	-
Stage 2	-	-	-	-	-	-	668	634	-	842	766	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1211	-	-	1429	-	-	474	466	894	474	466	695
Mov Cap-2 Maneuver	-	-	-	-	-	-	474	466	-	474	466	-
Stage 1	-	-	-	-	-	-	839	763	-	665	634	-
Stage 2	-	-	-	-	-	-	668	634	-	839	763	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0			0			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1211	-	-	1429	-	-	-
HCM Lane V/C Ratio	-	0.003	-	-	-	-	-	-
HCM Control Delay (s)	0	8	0	-	0	-	-	0
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	15.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	260	117	9	357	240	32
Future Vol, veh/h	260	117	9	357	240	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	325	146	11	446	300	40

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	471	0	793 325
Stage 1	-	-	-	-	325 -
Stage 2	-	-	-	-	468 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1091	-	358 716
Stage 1	-	-	-	-	732 -
Stage 2	-	-	-	-	630 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1091	-	354 716
Mov Cap-2 Maneuver	-	-	-	-	354 -
Stage 1	-	-	-	-	732 -
Stage 2	-	-	-	-	624 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	59.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	376	-	-	1091	-
HCM Lane V/C Ratio	0.904	-	-	0.01	-
HCM Control Delay (s)	59.1	-	-	8.3	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	9.3	-	-	0	-

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	181	102	186	67	107	190
Future Vol, veh/h	181	102	186	67	107	190
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	213	120	219	79	126	224
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	13.9	12.2	11.2
HCM LOS	B	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	64%	0%	100%	0%
Vol Thru, %	36%	74%	0%	0%
Vol Right, %	0%	26%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	283	253	107	190
LT Vol	181	0	107	0
Through Vol	102	186	0	0
RT Vol	0	67	0	190
Lane Flow Rate	333	298	126	224
Geometry Grp	2	2	7	7
Degree of Util (X)	0.504	0.433	0.234	0.34
Departure Headway (Hd)	5.454	5.238	6.698	5.481
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	663	688	536	657
Service Time	3.485	3.269	4.431	3.214
HCM Lane V/C Ratio	0.502	0.433	0.235	0.341
HCM Control Delay	13.9	12.2	11.5	11
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.8	2.2	0.9	1.5

**Intersection**

Intersection Delay, s/veh 11.7  
Intersection LOS B







Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	133	100	72	166	171	168
Future Vol, veh/h	133	100	72	166	171	168
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	160	120	87	200	206	202
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.5	12.6	10.5
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	30%	57%	0%	0%
Vol Thru, %	70%	0%	100%	0%
Vol Right, %	0%	43%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	238	233	171	168
LT Vol	72	133	0	0
Through Vol	166	0	171	0
RT Vol	0	100	0	168
Lane Flow Rate	287	281	206	202
Geometry Grp	5	2	7	7
Degree of Util (X)	0.433	0.425	0.327	0.282
Departure Headway (Hd)	5.436	5.45	5.719	5.01
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	662	663	630	719
Service Time	3.463	3.479	3.445	2.736
HCM Lane V/C Ratio	0.434	0.424	0.327	0.281
HCM Control Delay	12.6	12.5	11.2	9.7
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	2.2	2.1	1.4	1.2

Queues  
24: Brunswick Rd & Loma Rica Dr













Existing PM Peak  
01/11/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	350	390	49	127	549
v/c Ratio	0.44	0.43	0.63	0.09	0.38	0.44
Control Delay	26.3	4.5	21.2	5.4	25.3	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	4.5	21.2	5.4	25.3	6.9
Queue Length 50th (ft)	43	10	101	0	35	81
Queue Length 95th (ft)	121	60	221	19	96	162
Internal Link Dist (ft)	1047		692			753
Turn Bay Length (ft)	165			405	410	
Base Capacity (vph)	542	1108	1145	991	744	1690
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.32	0.34	0.05	0.17	0.32
<b>Intersection Summary</b>						



HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Existing PM Peak  
 01/11/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	146	322	359	45	117	505
Future Volume (veh/h)	146	322	359	45	117	505
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	159	350	390	49	127	549
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	442	543	530	449	167	923
Arrive On Green	0.25	0.25	0.29	0.29	0.10	0.51
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	159	350	390	49	127	549
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	3.2	8.1	8.3	1.0	3.1	9.1
Cycle Q Clear(g_c), s	3.2	8.1	8.3	1.0	3.1	9.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	442	543	530	449	167	923
V/C Ratio(X)	0.36	0.65	0.74	0.11	0.76	0.59
Avail Cap(c_a), veh/h	588	672	1286	1090	807	2095
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.1	11.7	13.7	11.2	18.9	7.5
Incr Delay (d2), s/veh	0.5	1.5	2.0	0.1	6.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	2.4	2.7	0.3	1.3	2.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.6	13.2	15.7	11.3	25.7	8.1
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	509		439			676
Approach Delay, s/veh	13.3		15.2			11.4
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.2	18.3			27.5	15.4
Change Period (Y+Rc), s	5.1	5.8			5.8	4.5
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.5
Max Q Clear Time (g_c+I1), s	5.1	10.3			11.1	10.1
Green Ext Time (p_c), s	0.2	2.2			3.5	0.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			13.0			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	10.5	21.4	5.6	10.9

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.0	0.0	0.4
Total Del/Veh (s)	5.8	8.4	18.6	10.3

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.5	0.3
Total Del/Veh (s)	11.0	9.8	1.9	7.0

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.2
Total Del/Veh (s)	19.1	10.3	16.1	15.8	13.8

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.7	0.7
Total Del/Veh (s)	14.1	14.6	19.9	36.8	20.7

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	7.4	8.8	25.6	12.4

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.4	0.0	0.4
Total Del/Veh (s)	16.3	33.4	28.5	12.1	22.4

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.1	1.7	0.5
Total Del/Veh (s)	14.3	14.8	11.5	13.7

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.3	0.0	0.2	1.2
Total Del/Veh (s)	8.8	7.9	10.6	8.8

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Total Zone Performance

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Denied Del/Veh (s)	1.3
Total Del/Veh (s)	659.3

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	111	211	99	93
Average Queue (ft)	75	93	44	44
95th Queue (ft)	118	168	82	81
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	7			
Queuing Penalty (veh)	22			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	143	111	161	126	116
Average Queue (ft)	83	32	80	78	62
95th Queue (ft)	138	76	135	120	107
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			5	2
Queuing Penalty (veh)	4			8	3
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	5		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	144	138	41	76	50
Average Queue (ft)	76	65	15	40	5
95th Queue (ft)	119	110	41	63	27
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	46	120	120	167	25	246	140	182	211	134
Average Queue (ft)	14	48	51	81	2	89	60	60	106	57
95th Queue (ft)	40	91	94	150	13	169	117	134	172	109
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	0						
Queuing Penalty (veh)		0	0	1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						3	0			
Queuing Penalty (veh)						6	1			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	168	191	102	175	175	121	179	210	231	100	85
Average Queue (ft)	90	129	62	59	94	33	85	111	138	37	44
95th Queue (ft)	170	201	106	143	171	83	152	192	208	82	75
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	5	3	4	6						
Queuing Penalty (veh)	1	17	0	13	21						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			3	4		1	6	0	0		
Queuing Penalty (veh)			7	4		1	2	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	134	146	188	246	73	216	226	258
Average Queue (ft)	45	50	52	68	3	137	147	40
95th Queue (ft)	103	111	142	174	47	213	231	165
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	11	14	
Queuing Penalty (veh)				0	0	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	128	140	203	192	193	179	252	334	235	290	234	122
Average Queue (ft)	56	74	91	101	92	83	115	190	86	165	87	59
95th Queue (ft)	107	122	161	162	160	145	199	292	187	250	173	104
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)			0									
Queuing Penalty (veh)			0									
Storage Bay Dist (ft)	240	240			240	120			280			280
Storage Blk Time (%)			0	0	0	3	5			0		0
Queuing Penalty (veh)			0	0	0	9	8			2		0

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	123
Average Queue (ft)	53
95th Queue (ft)	99
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	187	142	71	76	94	76	145	48
Average Queue (ft)	82	62	22	26	42	26	57	19
95th Queue (ft)	151	125	55	57	78	59	108	43
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)	0							
Queuing Penalty (veh)	0							
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	241	174	109	92	96	99	67
Average Queue (ft)	95	61	54	30	32	47	35
95th Queue (ft)	177	120	96	71	77	84	59
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	3	0					

Zone Summary

Zone wide Queuing Penalty: 139



# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

PM Peak  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	66	3.0	0.225	6.3	LOS A	1.0	26.0	0.52	0.44	0.52	33.7
8	T1	65	3.0	0.225	6.3	LOS A	1.0	26.0	0.52	0.44	0.52	33.6
18	R2	73	3.0	0.225	6.3	LOS A	1.0	26.0	0.52	0.44	0.52	32.6
Approach		204	3.0	0.225	6.3	LOS A	1.0	26.0	0.52	0.44	0.52	33.3
East: Idaho Maryland Rd												
1	L2	318	3.0	0.317	6.8	LOS A	1.5	37.6	0.50	0.42	0.50	31.7
6	T1	246	3.0	0.474	9.1	LOS A	2.8	72.4	0.59	0.53	0.64	33.0
16	R2	233	3.0	0.474	9.1	LOS A	2.8	72.4	0.59	0.53	0.64	32.0
Approach		797	3.0	0.474	8.2	LOS A	2.8	72.4	0.55	0.49	0.58	32.2
North: Main St												
7	L2	73	3.0	0.359	8.9	LOS A	1.6	40.8	0.61	0.64	0.68	32.6
4	T1	213	3.0	0.359	8.9	LOS A	1.6	40.8	0.61	0.64	0.68	32.6
14	R2	329	3.0	0.203	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		615	3.0	0.359	4.1	LOS A	1.6	40.8	0.29	0.30	0.32	34.9
West: Main St												
5	L2	207	3.0	0.412	9.5	LOS A	2.1	53.7	0.63	0.69	0.79	31.4
2	T1	93	3.0	0.412	9.5	LOS A	2.1	53.7	0.63	0.69	0.79	31.4
12	R2	35	3.0	0.412	9.5	LOS A	2.1	53.7	0.63	0.69	0.79	30.5
Approach		335	3.0	0.412	9.5	LOS A	2.1	53.7	0.63	0.69	0.79	31.3
All Vehicles		1951	3.0	0.474	6.9	LOS A	2.8	72.4	0.48	0.46	0.53	32.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\1-5 Exist\1.2 PM Peak Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	15	96	2	0	0	0	0	84	95	88	94	0
Future Vol, veh/h	15	96	2	0	0	0	0	84	95	88	94	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	109	2	0	0	0	0	95	108	100	107	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9	9.6	9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	24%	0%	100%	0%
Vol Thru, %	47%	76%	96%	0%	100%
Vol Right, %	53%	0%	4%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	179	63	50	88	94
LT Vol	0	15	0	88	0
Through Vol	84	48	48	0	94
RT Vol	95	0	2	0	0
Lane Flow Rate	203	72	57	100	107
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.272	0.112	0.087	0.155	0.15
Departure Headway (Hd)	4.814	5.65	5.502	5.568	5.065
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	747	634	650	644	708
Service Time	2.844	3.392	3.244	3.299	2.796
HCM Lane V/C Ratio	0.272	0.114	0.088	0.155	0.151
HCM Control Delay	9.6	9.1	8.8	9.3	8.7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	1.1	0.4	0.3	0.5	0.5

**Intersection**

Intersection Delay, s/veh 13.5

Intersection LOS B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	169	13	29	149	125	323
Future Vol, veh/h	169	13	29	149	125	323
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	219	17	38	194	162	419
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	13.2	11	14.7
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	37%	0%
Vol Thru, %	0%	0%	93%	63%	100%
Vol Right, %	0%	100%	7%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	323	182	79	99
LT Vol	125	0	0	29	0
Through Vol	0	0	169	50	99
RT Vol	0	323	13	0	0
Lane Flow Rate	162	419	236	102	129
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.29	0.609	0.401	0.188	0.231
Departure Headway (Hd)	6.44	5.228	6.113	6.629	6.442
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	558	692	589	541	557
Service Time	4.171	2.959	4.148	4.369	4.182
HCM Lane V/C Ratio	0.29	0.605	0.401	0.189	0.232
HCM Control Delay	11.8	15.8	13.2	10.9	11.1
HCM Lane LOS	B	C	B	B	B
HCM 95th-tile Q	1.2	4.2	1.9	0.7	0.9

**Intersection**

Intersection Delay, s/veh 10.7  
Intersection LOS B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	433	68	20	141	44	7
Future Vol, veh/h	433	68	20	141	44	7
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	555	87	26	181	56	9
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	11.4	9.1	9.4
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	86%	0%	0%	30%	0%
Vol Thru, %	0%	100%	68%	70%	100%
Vol Right, %	14%	0%	32%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	51	289	212	67	94
LT Vol	44	0	0	20	0
Through Vol	0	289	144	47	94
RT Vol	7	0	68	0	0
Lane Flow Rate	65	370	272	86	121
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.103	0.504	0.354	0.13	0.178
Departure Headway (Hd)	5.698	4.907	4.682	5.454	5.304
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	628	736	768	656	676
Service Time	3.747	2.636	2.411	3.194	3.043
HCM Lane V/C Ratio	0.104	0.503	0.354	0.131	0.179
HCM Control Delay	9.4	12.5	10	9	9.2
HCM Lane LOS	A	B	A	A	A
HCM 95th-tile Q	0.3	2.9	1.6	0.4	0.6

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻	↻	↻	↻		↻	↻	↻
Traffic Vol, veh/h	0	0	106	45	0	53	96	210	10	11	197	3
Future Vol, veh/h	0	0	106	45	0	53	96	210	10	11	197	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	128	54	0	64	116	253	12	13	237	4

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	760	237	820	758	259	241	0	0	265	0	0
Stage 1	-	263	-	491	491	-	-	-	-	-	-	-
Stage 2	-	497	-	329	267	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	336	802	294	336	780	1326	-	-	1299	-	-
Stage 1	0	691	-	559	548	-	-	-	-	-	-	-
Stage 2	0	545	-	684	688	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	304	802	229	304	780	1326	-	-	1299	-	-
Mov Cap-2 Maneuver	-	304	-	229	304	-	-	-	-	-	-	-
Stage 1	-	684	-	510	500	-	-	-	-	-	-	-
Stage 2	-	498	-	569	681	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.3		17.1		2.4		0.4	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1326	-	-	802	229	780	1299	-	-
HCM Lane V/C Ratio	0.087	-	-	0.159	0.237	0.082	0.01	-	-
HCM Control Delay (s)	8	-	-	10.3	25.5	10	7.8	-	-
HCM Lane LOS	A	-	-	B	D	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	0.9	0.3	0	-	-

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	13	28	34	302	290	43
Future Vol, veh/h	13	28	34	302	290	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	37	45	397	382	57

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	898	220	439	0	-	0
Stage 1	411	-	-	-	-	-
Stage 2	487	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	294	785	1119	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	617	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	282	785	1119	-	-	-
Mov Cap-2 Maneuver	478	-	-	-	-	-
Stage 1	612	-	-	-	-	-
Stage 2	617	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1119	-	478	785	-	-
HCM Lane V/C Ratio	0.04	-	0.036	0.047	-	-
HCM Control Delay (s)	8.4	-	12.8	9.8	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	10	10	8	28	23	76	16	291	6	25	97	11
Future Vol, veh/h	10	10	8	28	23	76	16	291	6	25	97	11
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	11	9	31	26	84	18	323	7	28	108	12
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	8.6	9.1	12	9
HCM LOS	A	A	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	36%	22%	100%	0%
Vol Thru, %	0%	98%	36%	18%	0%	90%
Vol Right, %	0%	2%	29%	60%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	16	297	28	127	25	108
LT Vol	16	0	10	28	25	0
Through Vol	0	291	10	23	0	97
RT Vol	0	6	8	76	0	11
Lane Flow Rate	18	330	31	141	28	120
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.028	0.466	0.045	0.191	0.045	0.174
Departure Headway (Hd)	5.606	5.089	5.264	4.882	5.794	5.218
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	637	706	675	732	616	684
Service Time	3.356	2.839	3.333	2.933	3.552	2.976
HCM Lane V/C Ratio	0.028	0.467	0.046	0.193	0.045	0.175
HCM Control Delay	8.5	12.2	8.6	9.1	8.8	9.1
HCM Lane LOS	A	B	A	A	A	A
HCM 95th-tile Q	0.1	2.5	0.1	0.7	0.1	0.6

Intersection						
Int Delay, s/veh	5.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	46	123	127	229	117	43
Future Vol, veh/h	46	123	127	229	117	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	154	159	286	146	54

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	159	0	-	0	429 159
Stage 1	-	-	-	-	159 -
Stage 2	-	-	-	-	270 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1420	-	-	0	583 886
Stage 1	-	-	-	0	870 -
Stage 2	-	-	-	0	775 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1420	-	-	-	559 886
Mov Cap-2 Maneuver	-	-	-	-	559 -
Stage 1	-	-	-	-	834 -
Stage 2	-	-	-	-	775 -

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1420	-	-	559	886
HCM Lane V/C Ratio	0.04	-	-	0.262	0.061
HCM Control Delay (s)	7.6	-	-	13.7	9.3
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1	0.2



Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	317	138	0
Future Vol, veh/h	0	0	0	317	138	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	360	157	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	517	157	157	0	0
Stage 1	157	-	-	-	-
Stage 2	360	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	518	889	1423	-	-
Stage 1	871	-	-	-	-
Stage 2	706	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	518	889	1423	-	-
Mov Cap-2 Maneuver	642	-	-	-	-
Stage 1	871	-	-	-	-
Stage 2	706	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1423	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	28	0	0	53	0	0
Future Vol, veh/h	28	0	0	53	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	0	0	58	0	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	30	0	88
Stage 1	-	-	-	-	30
Stage 2	-	-	-	-	58
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1583	-	913
Stage 1	-	-	-	-	993
Stage 2	-	-	-	-	965
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1583	-	913
Mov Cap-2 Maneuver	-	-	-	-	913
Stage 1	-	-	-	-	993
Stage 2	-	-	-	-	965

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1583	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	176	0	0	66	0	0	0	0	0	0	0
Future Vol, veh/h	0	176	0	0	66	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	71	71	71	71	71	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	248	0	0	93	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	93	0	0	248	0	0	341	341	248	341	341	93
Stage 1	-	-	-	-	-	-	248	248	-	93	93	-
Stage 2	-	-	-	-	-	-	93	93	-	248	248	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1501	-	-	1318	-	-	613	581	791	613	581	964
Stage 1	-	-	-	-	-	-	756	701	-	914	818	-
Stage 2	-	-	-	-	-	-	914	818	-	756	701	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1501	-	-	1318	-	-	613	581	791	613	581	964
Mov Cap-2 Maneuver	-	-	-	-	-	-	613	581	-	613	581	-
Stage 1	-	-	-	-	-	-	756	701	-	914	818	-
Stage 2	-	-	-	-	-	-	914	818	-	756	701	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			0			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1501	-	-	1318	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	146	173	10	124	39	6
Future Vol, veh/h	146	173	10	124	39	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	195	231	13	165	52	8

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	426	0	386
Stage 1	-	-	-	-	195
Stage 2	-	-	-	-	191
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1133	-	617
Stage 1	-	-	-	-	838
Stage 2	-	-	-	-	841
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1133	-	610
Mov Cap-2 Maneuver	-	-	-	-	610
Stage 1	-	-	-	-	838
Stage 2	-	-	-	-	832

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	634	-	-	1133	-
HCM Lane V/C Ratio	0.095	-	-	0.012	-
HCM Control Delay (s)	11.3	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	↕
Traffic Vol, veh/h	48	89	68	42	22	59
Future Vol, veh/h	48	89	68	42	22	59
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	105	80	49	26	69
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.4	7.8	7.9
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	35%	0%	100%	0%
Vol Thru, %	65%	62%	0%	0%
Vol Right, %	0%	38%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	110	22	59
LT Vol	48	0	22	0
Through Vol	89	68	0	0
RT Vol	0	42	0	59
Lane Flow Rate	161	129	26	69
Geometry Grp	2	2	7	7
Degree of Util (X)	0.196	0.148	0.041	0.086
Departure Headway (Hd)	4.376	4.107	5.675	4.469
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	825	876	633	804
Service Time	2.376	2.119	3.392	2.186
HCM Lane V/C Ratio	0.195	0.147	0.041	0.086
HCM Control Delay	8.4	7.8	8.6	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.5	0.1	0.3

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↕			↕			↕	↗
Traffic Vol, veh/h	32	12	32	12	37	6	49	32	4	1	42	46
Future Vol, veh/h	32	12	32	12	37	6	49	32	4	1	42	46
Peak Hour Factor	0.78	0.92	0.78	0.92	0.92	0.92	0.78	0.78	0.92	0.92	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	13	41	13	40	7	63	41	4	1	54	59
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	7.9	7.9	8.4	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	58%	42%	22%	2%	0%
Vol Thru, %	38%	16%	67%	98%	0%
Vol Right, %	5%	42%	11%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	85	76	55	43	46
LT Vol	49	32	12	1	0
Through Vol	32	12	37	42	0
RT Vol	4	32	6	0	46
Lane Flow Rate	108	95	60	55	59
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.138	0.115	0.075	0.076	0.07
Departure Headway (Hd)	4.602	4.35	4.535	4.992	4.277
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	781	826	792	720	839
Service Time	2.619	2.365	2.552	2.708	1.993
HCM Lane V/C Ratio	0.138	0.115	0.076	0.076	0.07
HCM Control Delay	8.4	7.9	7.9	8.1	7.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.5	0.4	0.2	0.2	0.2

Queues  
24: Brunswick Rd & Loma Rica Dr

Existing 0630  
01/11/2021















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	30	87	290	130	230	124
v/c Ratio	0.09	0.13	0.45	0.21	0.43	0.09
Control Delay	21.5	2.8	15.6	4.5	17.1	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	2.8	15.6	4.5	17.1	2.3
Queue Length 50th (ft)	4	0	36	0	29	0
Queue Length 95th (ft)	32	18	153	32	131	24
Internal Link Dist (ft)	768		708			723
Turn Bay Length (ft)	165			405	410	
Base Capacity (vph)	775	1085	1446	1255	1035	1760
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.08	0.20	0.10	0.22	0.07

Intersection Summary

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Existing 0630  
 01/11/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	28	80	267	120	212	114
Future Volume (veh/h)	28	80	267	120	212	114
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	30	87	290	130	230	124
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	172	426	466	395	307	1065
Arrive On Green	0.10	0.10	0.26	0.26	0.18	0.58
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	30	87	290	130	230	124
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.5	1.5	4.7	2.3	4.2	1.0
Cycle Q Clear(g_c), s	0.5	1.5	4.7	2.3	4.2	1.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	172	426	466	395	307	1065
V/C Ratio(X)	0.17	0.20	0.62	0.33	0.75	0.12
Avail Cap(c_a), veh/h	728	921	1637	1388	1028	2667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.9	9.4	11.1	10.2	13.2	3.1
Incr Delay (d2), s/veh	0.5	0.2	1.4	0.5	3.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	1.4	0.5	1.4	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.4	9.6	12.5	10.7	16.8	3.2
LnGrp LOS	B	A	B	B	B	A
Approach Vol, veh/h	117		420			354
Approach Delay, s/veh	10.8		11.9			12.0
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.1	14.4			25.5	8.2
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.2	6.7			3.0	3.5
Green Ext Time (p_c), s	0.5	1.9			0.6	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.8			
HCM 6th LOS			B			





1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	2.5	9.5	4.1	4.8

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.5	0.0	0.5
Total Del/Veh (s)	4.2	5.6	8.4	6.1

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	5.5	7.6	0.5	3.9

8: Main St & Maltman Dr/Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.3	2.0	0.9
Total Del/Veh (s)	14.1	4.4	7.5	6.3	5.8

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.7	2.9	0.9
Total Del/Veh (s)	3.9	9.4	16.8	37.5	16.6

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.3	3.8	20.1	8.6

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	1.5	0.0	0.2
Total Del/Veh (s)	5.3	8.4	10.9	1.1	4.8

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.9	0.5
Total Del/Veh (s)	11.0	10.3	6.1	7.9

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.0	0.0	0.1	0.6
Total Del/Veh (s)	4.5	3.1	4.9	3.7

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Total Zone Performance

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Denied Del/Veh (s)	1.1
Total Del/Veh (s)	60.1

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	80	102	66	51
Average Queue (ft)	26	44	24	15
95th Queue (ft)	59	81	56	40
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	90	59	77	105	88
Average Queue (ft)	41	23	30	44	28
95th Queue (ft)	69	55	63	84	63
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	65	51	30	51	2
Average Queue (ft)	35	26	7	31	0
95th Queue (ft)	53	49	27	44	2
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Main St & Maltman Dr/Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB	
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR	
Maximum Queue (ft)	36	45	51	84	22	64	47	37	76	46	
Average Queue (ft)	7	16	17	27	1	26	14	6	30	13	
95th Queue (ft)	27	37	42	60	10	56	40	25	57	37	
Link Distance (ft)	777	160	160	160		1486				1622	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)					115			115	360	360	
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	39	70	68	60	92	32	39	124	146	46	65
Average Queue (ft)	8	18	28	9	23	4	8	29	73	13	24
95th Queue (ft)	27	49	60	36	69	19	30	81	130	38	52
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)					0	0					
Queuing Penalty (veh)					0	0					
Storage Bay Dist (ft)				140			100	240	240		
Storage Blk Time (%)					0						
Queuing Penalty (veh)					0						

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	44	27	18	29	182	115	19
Average Queue (ft)	5	4	1	2	84	56	1
95th Queue (ft)	24	17	10	14	147	93	11
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					2	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	57	66	62	87	50	54	76	118	26	60	36	42
Average Queue (ft)	14	30	16	35	17	18	30	46	4	22	12	13
95th Queue (ft)	44	56	47	74	44	43	63	93	18	47	31	39
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	31
Average Queue (ft)	6
95th Queue (ft)	26
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	77	58	22	43	54	45	125	40
Average Queue (ft)	27	19	3	13	18	10	56	9
95th Queue (ft)	58	48	15	34	42	35	100	30
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	76	44	57	75	70	32	54
Average Queue (ft)	23	17	17	23	13	6	27
95th Queue (ft)	56	37	46	60	47	26	46
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 1
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# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

0630-0730 AM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	13	3.0	0.082	4.5	LOS A	0.3	8.6	0.44	0.32	0.44	35.0
8	T1	21	3.0	0.082	4.5	LOS A	0.3	8.6	0.44	0.32	0.44	34.9
18	R2	44	3.0	0.082	4.5	LOS A	0.3	8.6	0.44	0.32	0.44	33.9
Approach		78	3.0	0.082	4.5	LOS A	0.3	8.6	0.44	0.32	0.44	34.3
East: Idaho Maryland Rd												
1	L2	105	3.0	0.090	3.9	LOS A	0.4	9.2	0.30	0.18	0.30	33.0
6	T1	55	3.0	0.149	4.4	LOS A	0.6	15.9	0.32	0.20	0.32	35.4
16	R2	118	3.0	0.149	4.4	LOS A	0.6	15.9	0.32	0.20	0.32	34.3
Approach		278	3.0	0.149	4.2	LOS A	0.6	15.9	0.31	0.19	0.31	34.0
North: Main St												
7	L2	68	3.0	0.186	4.6	LOS A	0.8	19.4	0.30	0.19	0.30	34.6
4	T1	153	3.0	0.186	4.6	LOS A	0.8	19.4	0.30	0.19	0.30	34.5
14	R2	77	3.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		297	3.0	0.186	3.4	LOS A	0.8	19.4	0.23	0.14	0.23	35.2
West: Main St												
5	L2	148	3.0	0.269	6.1	LOS A	1.1	29.2	0.45	0.36	0.45	33.2
2	T1	108	3.0	0.269	6.1	LOS A	1.1	29.2	0.45	0.36	0.45	33.1
12	R2	23	3.0	0.269	6.1	LOS A	1.1	29.2	0.45	0.36	0.45	32.2
Approach		279	3.0	0.269	6.1	LOS A	1.1	29.2	0.45	0.36	0.45	33.1
All Vehicles		932	3.0	0.269	4.5	LOS A	1.1	29.2	0.34	0.24	0.34	34.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕		↕	↕	
Traffic Vol, veh/h	47	329	3	0	0	0	0	95	147	162	296	0
Future Vol, veh/h	47	329	3	0	0	0	0	95	147	162	296	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	52	366	3	0	0	0	0	106	163	180	329	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14	14.4	15.7
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	22%	0%	100%	0%
Vol Thru, %	39%	78%	98%	0%	100%
Vol Right, %	61%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	242	212	168	162	296
LT Vol	0	47	0	162	0
Through Vol	95	165	165	0	296
RT Vol	147	0	3	0	0
Lane Flow Rate	269	235	186	180	329
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.461	0.442	0.344	0.339	0.573
Departure Headway (Hd)	6.166	6.772	6.646	6.78	6.272
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	583	531	540	529	576
Service Time	4.217	4.522	4.397	4.532	4.024
HCM Lane V/C Ratio	0.461	0.443	0.344	0.34	0.571
HCM Control Delay	14.4	14.8	12.9	13	17.2
HCM Lane LOS	B	B	B	B	C
HCM 95th-tile Q	2.4	2.2	1.5	1.5	3.6

Intersection	
Intersection Delay, s/veh	18.2
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	243	49	49	574	203	206
Future Vol, veh/h	243	49	49	574	203	206
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	259	52	52	611	216	219
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	17.3	20.9	14.8
HCM LOS	C	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	20%	0%
Vol Thru, %	0%	0%	83%	80%	100%
Vol Right, %	0%	100%	17%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	203	206	292	240	383
LT Vol	203	0	0	49	0
Through Vol	0	0	243	191	383
RT Vol	0	206	49	0	0
Lane Flow Rate	216	219	311	256	407
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.454	0.386	0.556	0.464	0.728
Departure Headway (Hd)	7.57	6.347	6.448	6.539	6.435
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	475	565	559	550	562
Service Time	5.333	4.109	4.508	4.3	4.196
HCM Lane V/C Ratio	0.455	0.388	0.556	0.465	0.724
HCM Control Delay	16.5	13.1	17.3	14.9	24.6
HCM Lane LOS	C	B	C	B	C
HCM 95th-tile Q	2.3	1.8	3.4	2.4	6.1

**Intersection**

Intersection Delay, s/veh 15.9

Intersection LOS C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	375	88	31	519	107	49
Future Vol, veh/h	375	88	31	519	107	49
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	462	108	38	639	132	60
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14	18.3	12.8
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	69%	0%	0%	15%	0%
Vol Thru, %	0%	100%	59%	85%	100%
Vol Right, %	31%	0%	41%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	250	213	204	346
LT Vol	107	0	0	31	0
Through Vol	0	250	125	173	346
RT Vol	49	0	88	0	0
Lane Flow Rate	192	308	262	251	426
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.343	0.519	0.421	0.419	0.701
Departure Headway (Hd)	6.433	6.073	5.78	6.007	5.929
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	559	594	621	600	609
Service Time	4.476	3.817	3.524	3.748	3.671
HCM Lane V/C Ratio	0.343	0.519	0.422	0.418	0.7
HCM Control Delay	12.8	15.2	12.7	13	21.5
HCM Lane LOS	B	C	B	B	C
HCM 95th-tile Q	1.5	3	2.1	2.1	5.6

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	0	0	191	26	0	47	181	452	47	84	417	13
Future Vol, veh/h	0	0	191	26	0	47	181	452	47	84	417	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	203	28	0	50	193	481	50	89	444	14

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	1539	444	1623	1528	506	458	0	0	531	0	0
Stage 1	-	622	-	892	892	-	-	-	-	-	-	-
Stage 2	-	917	-	731	636	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	116	614	82	117	566	1103	-	-	1036	-	-
Stage 1	0	479	-	337	360	-	-	-	-	-	-	-
Stage 2	0	351	-	413	472	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	87	614	44	88	566	1103	-	-	1036	-	-
Mov Cap-2 Maneuver	-	87	-	44	88	-	-	-	-	-	-	-
Stage 1	-	438	-	278	297	-	-	-	-	-	-	-
Stage 2	-	290	-	253	431	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	13.7		70.7		2.4		1.4	
HCM LOS	B		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1103	-	-	614	44	566	1036	-	-
HCM Lane V/C Ratio	0.175	-	-	0.331	0.629	0.088	0.086	-	-
HCM Control Delay (s)	9	-	-	13.7	176.8	12	8.8	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	1.4	2.4	0.3	0.3	-	-

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	62	69	39	621	592	32
Future Vol, veh/h	62	69	39	621	592	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	64	71	40	640	610	33

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1347	322	643	0	-	0
Stage 1	627	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	154	674	940	-	-	-
Stage 1	496	-	-	-	-	-
Stage 2	481	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	147	674	940	-	-	-
Mov Cap-2 Maneuver	349	-	-	-	-	-
Stage 1	475	-	-	-	-	-
Stage 2	481	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.1	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	940	-	349	674	-	-
HCM Lane V/C Ratio	0.043	-	0.183	0.106	-	-
HCM Control Delay (s)	9	-	17.6	11	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.4	-	-

Intersection	
Intersection Delay, s/veh	17.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	22	29	10	17	23	73	7	326	23	118	425	24
Future Vol, veh/h	22	29	10	17	23	73	7	326	23	118	425	24
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	31	11	18	24	78	7	347	24	126	452	26
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	10.6	10.8	16.8	19.9
HCM LOS	B	B	C	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	36%	15%	100%	0%
Vol Thru, %	0%	93%	48%	20%	0%	95%
Vol Right, %	0%	7%	16%	65%	0%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	349	61	113	118	449
LT Vol	7	0	22	17	118	0
Through Vol	0	326	29	23	0	425
RT Vol	0	23	10	73	0	24
Lane Flow Rate	7	371	65	120	126	478
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.013	0.601	0.119	0.204	0.213	0.738
Departure Headway (Hd)	6.376	5.823	6.619	6.123	6.103	5.56
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	561	620	539	584	589	650
Service Time	4.119	3.565	4.684	4.182	3.839	3.295
HCM Lane V/C Ratio	0.012	0.598	0.121	0.205	0.214	0.735
HCM Control Delay	9.2	17	10.6	10.8	10.5	22.4
HCM Lane LOS	A	C	B	B	B	C
HCM 95th-tile Q	0	4	0.4	0.8	0.8	6.5

Intersection						
Int Delay, s/veh	17.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	79	205	186	272	327	103
Future Vol, veh/h	79	205	186	272	327	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	225	204	299	359	113

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	204	0	-	0	603
Stage 1	-	-	-	-	204
Stage 2	-	-	-	-	399
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1368	-	-	0	462
Stage 1	-	-	-	0	830
Stage 2	-	-	-	0	678
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1368	-	-	-	432
Mov Cap-2 Maneuver	-	-	-	-	432
Stage 1	-	-	-	-	777
Stage 2	-	-	-	-	678

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	35.1
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1368	-	-	432	837
HCM Lane V/C Ratio	0.063	-	-	0.832	0.135
HCM Control Delay (s)	7.8	-	-	43	10
HCM Lane LOS	A	-	-	E	B
HCM 95th %tile Q(veh)	0.2	-	-	7.9	0.5

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	356	452	0
Future Vol, veh/h	0	0	0	356	452	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	375	476	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	851	476	476	0	-	0
Stage 1	476	-	-	-	-	-
Stage 2	375	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	330	589	1086	-	-	-
Stage 1	625	-	-	-	-	-
Stage 2	695	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	330	589	1086	-	-	-
Mov Cap-2 Maneuver	519	-	-	-	-	-
Stage 1	625	-	-	-	-	-
Stage 2	695	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1086	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-



Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	61	0	0	54	0	0
Future Vol, veh/h	61	0	0	54	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	0	0	59	0	0

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	66	0	125	66
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	59	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1536	-	870	998
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	964	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1536	-	870	998
Mov Cap-2 Maneuver	-	-	-	-	870	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	964	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1536	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	104	0	0	174	0	0	0	0	1	0	0
Future Vol, veh/h	5	104	0	0	174	0	0	0	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	137	0	0	229	0	0	0	0	1	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	229	0	0	137	0	0	406	406	137	406	406	229
Stage 1	-	-	-	-	-	-	177	177	-	229	229	-
Stage 2	-	-	-	-	-	-	229	229	-	177	177	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1339	-	-	1447	-	-	555	534	911	555	534	810
Stage 1	-	-	-	-	-	-	825	753	-	774	715	-
Stage 2	-	-	-	-	-	-	774	715	-	825	753	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1339	-	-	1447	-	-	548	525	911	548	525	810
Mov Cap-2 Maneuver	-	-	-	-	-	-	548	525	-	548	525	-
Stage 1	-	-	-	-	-	-	812	741	-	762	715	-
Stage 2	-	-	-	-	-	-	774	715	-	812	741	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			0			0			11.6		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1339	-	-	1447	-	-	548
HCM Lane V/C Ratio	-	0.015	-	-	-	-	-	0.002
HCM Control Delay (s)	0	7.7	0	-	0	-	-	11.6
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0

Intersection						
Int Delay, s/veh	15.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	260	117	9	357	240	32
Future Vol, veh/h	260	117	9	357	240	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	325	146	11	446	300	40

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	471	0	793 325
Stage 1	-	-	-	-	325 -
Stage 2	-	-	-	-	468 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1091	-	358 716
Stage 1	-	-	-	-	732 -
Stage 2	-	-	-	-	630 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1091	-	354 716
Mov Cap-2 Maneuver	-	-	-	-	354 -
Stage 1	-	-	-	-	732 -
Stage 2	-	-	-	-	624 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	59.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	376	-	-	1091	-
HCM Lane V/C Ratio	0.904	-	-	0.01	-
HCM Control Delay (s)	59.1	-	-	8.3	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	9.3	-	-	0	-

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	181	102	186	67	107	190
Future Vol, veh/h	181	102	186	67	107	190
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	213	120	219	79	126	224
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	13.9	12.2	11.2
HCM LOS	B	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	64%	0%	100%	0%
Vol Thru, %	36%	74%	0%	0%
Vol Right, %	0%	26%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	283	253	107	190
LT Vol	181	0	107	0
Through Vol	102	186	0	0
RT Vol	0	67	0	190
Lane Flow Rate	333	298	126	224
Geometry Grp	2	2	7	7
Degree of Util (X)	0.504	0.433	0.234	0.34
Departure Headway (Hd)	5.454	5.238	6.698	5.481
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	663	688	536	657
Service Time	3.485	3.269	4.431	3.214
HCM Lane V/C Ratio	0.502	0.433	0.235	0.341
HCM Control Delay	13.9	12.2	11.5	11
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.8	2.2	0.9	1.5

**Intersection**

Intersection Delay, s/veh 11.8  
Intersection LOS B

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	133	100	72	166	171	198
Future Vol, veh/h	133	100	72	166	171	198
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	160	120	87	200	206	239
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.7	12.7	10.7
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	30%	57%	0%	0%
Vol Thru, %	70%	0%	100%	0%
Vol Right, %	0%	43%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	238	233	171	198
LT Vol	72	133	0	0
Through Vol	166	0	171	0
RT Vol	0	100	0	198
Lane Flow Rate	287	281	206	239
Geometry Grp	5	2	7	7
Degree of Util (X)	0.436	0.43	0.328	0.333
Departure Headway (Hd)	5.479	5.511	5.73	5.021
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	657	654	628	716
Service Time	3.509	3.542	3.459	2.749
HCM Lane V/C Ratio	0.437	0.43	0.328	0.334
HCM Control Delay	12.7	12.7	11.2	10.2
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.2	2.2	1.4	1.5

Queues  
24: Brunswick Rd & Loma Rica Dr

Existing 1530  
01/11/2021















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	192	342	395	82	178	441
v/c Ratio	0.57	0.38	0.69	0.15	0.51	0.40
Control Delay	32.0	4.1	25.2	5.0	28.5	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	4.1	25.2	5.0	28.5	6.9
Queue Length 50th (ft)	59	10	117	0	55	68
Queue Length 95th (ft)	#159	60	240	26	132	120
Internal Link Dist (ft)	947		662			713
Turn Bay Length (ft)	165			405	410	
Base Capacity (vph)	436	1087	984	874	616	1624
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.31	0.40	0.09	0.29	0.27

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Existing 1530  
 01/11/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	177	315	363	75	164	406
Future Volume (veh/h)	177	315	363	75	164	406
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	192	342	395	82	178	441
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	412	575	527	447	234	973
Arrive On Green	0.24	0.24	0.29	0.29	0.13	0.53
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	192	342	395	82	178	441
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	4.4	8.3	9.1	1.9	4.6	6.9
Cycle Q Clear(g_c), s	4.4	8.3	9.1	1.9	4.6	6.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	412	575	527	447	234	973
V/C Ratio(X)	0.47	0.59	0.75	0.18	0.76	0.45
Avail Cap(c_a), veh/h	527	677	1185	1005	744	1931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	11.8	15.0	12.4	19.4	6.7
Incr Delay (d2), s/veh	0.8	1.0	2.2	0.2	5.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.5	3.1	0.5	1.8	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.0	12.8	17.2	12.6	24.5	7.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	534		477			619
Approach Delay, s/veh	14.0		16.4			12.0
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.4	19.2			30.6	15.9
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.6	11.1			8.9	10.3
Green Ext Time (p_c), s	0.4	2.3			2.7	0.7
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			13.9			
HCM 6th LOS			B			





1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	7.7	14.4	5.2	8.3

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	1.0	0.0	0.5
Total Del/Veh (s)	5.6	8.1	12.9	8.7

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.4	0.2
Total Del/Veh (s)	9.5	9.1	1.6	6.1

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.1
Total Del/Veh (s)	15.3	9.3	15.9	16.1	13.3

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.7
Total Del/Veh (s)	14.0	14.6	19.5	36.4	19.8

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.5	9.3	25.8	13.2

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.5	0.0	0.5
Total Del/Veh (s)	16.3	31.3	26.8	10.5	21.3

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	1.6	0.4
Total Del/Veh (s)	14.4	14.3	11.5	13.6

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.3	0.0	0.2	1.2
Total Del/Veh (s)	9.2	8.0	11.2	9.1

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Total Zone Performance

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Denied Del/Veh (s)	1.3
Total Del/Veh (s)	592.8

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	103	145	83	104
Average Queue (ft)	62	71	42	41
95th Queue (ft)	104	125	74	77
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	6			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	125	111	141	113	109
Average Queue (ft)	69	33	67	61	52
95th Queue (ft)	109	74	117	97	96
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			1	1
Queuing Penalty (veh)	0			2	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	1		
Queuing Penalty (veh)		0	2		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	139	125	37	74	39
Average Queue (ft)	67	54	15	35	5
95th Queue (ft)	108	95	39	58	23
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	48	98	106	160	23	182	136	188	228	129
Average Queue (ft)	13	46	50	77	2	85	63	64	109	55
95th Queue (ft)	39	84	90	145	13	152	117	141	183	103
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)				0						
Queuing Penalty (veh)				1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						3	0			
Queuing Penalty (veh)						5	1			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	172	193	102	190	181	106	153	191	211	96	111
Average Queue (ft)	94	132	67	73	99	34	73	93	128	25	45
95th Queue (ft)	175	202	107	166	175	80	128	173	191	68	86
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	5	2	5	7						
Queuing Penalty (veh)	3	17	0	18	25						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	5		0	4		0		
Queuing Penalty (veh)			5	6		1	1		0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	142	160	196	281	166	214	226	330
Average Queue (ft)	55	57	58	84	9	141	151	51
95th Queue (ft)	117	125	154	203	89	218	236	206
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	12	16	
Queuing Penalty (veh)				0	0	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	124	138	173	180	191	177	232	308	219	295	213	122
Average Queue (ft)	55	75	91	100	94	83	107	178	79	154	80	53
95th Queue (ft)	99	117	147	157	160	145	187	274	176	245	158	100
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280			280
Storage Blk Time (%)					0	3	4			0		
Queuing Penalty (veh)					0	9	6			2		

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	105
Average Queue (ft)	44
95th Queue (ft)	87
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	166	150	65	82	94	80	129	46
Average Queue (ft)	79	60	25	26	45	25	57	18
95th Queue (ft)	141	120	56	60	79	60	104	40
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	267	173	130	100	97	108	75
Average Queue (ft)	96	63	55	29	32	51	35
95th Queue (ft)	187	123	101	72	77	91	61
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	4	0					

Zone Summary

Zone wide Queuing Penalty: 115

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

1530-1630 PM  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	53	3.0	0.211	6.1	LOS A	0.9	24.0	0.52	0.44	0.52	33.8
8	T1	50	3.0	0.211	6.1	LOS A	0.9	24.0	0.52	0.44	0.52	33.8
18	R2	86	3.0	0.211	6.1	LOS A	0.9	24.0	0.52	0.44	0.52	32.8
Approach		190	3.0	0.211	6.1	LOS A	0.9	24.0	0.52	0.44	0.52	33.3
East: Idaho Maryland Rd												
1	L2	319	3.0	0.305	6.5	LOS A	1.4	36.5	0.47	0.37	0.47	31.8
6	T1	207	3.0	0.395	7.6	LOS A	2.0	51.6	0.51	0.42	0.51	33.8
16	R2	207	3.0	0.395	7.6	LOS A	2.0	51.6	0.51	0.42	0.51	32.7
Approach		733	3.0	0.395	7.1	LOS A	2.0	51.6	0.49	0.40	0.49	32.6
North: Main St												
7	L2	89	3.0	0.384	8.9	LOS A	1.8	46.5	0.61	0.64	0.70	32.5
4	T1	230	3.0	0.384	8.9	LOS A	1.8	46.5	0.61	0.64	0.70	32.5
14	R2	310	3.0	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		629	3.0	0.384	4.5	LOS A	1.8	46.5	0.31	0.33	0.36	34.6
West: Main St												
5	L2	194	3.0	0.419	9.9	LOS A	2.2	55.1	0.64	0.71	0.83	31.3
2	T1	96	3.0	0.419	9.9	LOS A	2.2	55.1	0.64	0.71	0.83	31.3
12	R2	41	3.0	0.419	9.9	LOS A	2.2	55.1	0.64	0.71	0.83	30.5
Approach		330	3.0	0.419	9.9	LOS A	2.2	55.1	0.64	0.71	0.83	31.2
All Vehicles		1882	3.0	0.419	6.6	LOS A	2.2	55.1	0.46	0.43	0.51	33.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	10.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	28	181	3	0	0	0	0	60	57	114	193	0
Future Vol, veh/h	28	181	3	0	0	0	0	60	57	114	193	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	201	3	0	0	0	0	67	63	127	214	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9.9	9.6	10.4
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	24%	0%	100%	0%
Vol Thru, %	51%	76%	97%	0%	100%
Vol Right, %	49%	0%	3%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	117	119	94	114	193
LT Vol	0	28	0	114	0
Through Vol	60	91	91	0	193
RT Vol	57	0	3	0	0
Lane Flow Rate	130	132	104	127	214
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.191	0.213	0.164	0.205	0.317
Departure Headway (Hd)	5.292	5.827	5.686	5.822	5.319
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	673	612	627	614	673
Service Time	3.363	3.596	3.455	3.583	3.079
HCM Lane V/C Ratio	0.193	0.216	0.166	0.207	0.318
HCM Control Delay	9.6	10.2	9.6	10.1	10.6
HCM Lane LOS	A	B	A	B	B
HCM 95th-tile Q	0.7	0.8	0.6	0.8	1.4



**Intersection**

Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	92	27	16	245	82	85
Future Vol, veh/h	92	27	16	245	82	85
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	111	33	19	295	99	102
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	9.5	9.7	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	16%	0%
Vol Thru, %	0%	0%	77%	84%	100%
Vol Right, %	0%	100%	23%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	82	85	119	98	163
LT Vol	82	0	0	16	0
Through Vol	0	0	92	82	163
RT Vol	0	85	27	0	0
Lane Flow Rate	99	102	143	118	197
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.169	0.14	0.203	0.173	0.285
Departure Headway (Hd)	6.146	4.937	5.096	5.296	5.214
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	582	723	701	675	687
Service Time	3.903	2.693	3.149	3.044	2.961
HCM Lane V/C Ratio	0.17	0.141	0.204	0.175	0.287
HCM Control Delay	10.2	8.5	9.5	9.2	10
HCM Lane LOS	B	A	A	A	A
HCM 95th-tile Q	0.6	0.5	0.8	0.6	1.2

**Intersection**

Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Vol, veh/h	165	8	2	217	27	12
Future Vol, veh/h	165	8	2	217	27	12
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	193	9	2	254	32	14
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	8.4	8.7	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	69%	0%	0%	3%	0%
Vol Thru, %	0%	100%	87%	97%	100%
Vol Right, %	31%	0%	13%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	110	63	74	145
LT Vol	27	0	0	2	0
Through Vol	0	110	55	72	145
RT Vol	12	0	8	0	0
Lane Flow Rate	46	129	74	87	169
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.062	0.174	0.098	0.117	0.227
Departure Headway (Hd)	4.907	4.855	4.766	4.836	4.822
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	731	742	755	746	749
Service Time	2.929	2.569	2.48	2.536	2.522
HCM Lane V/C Ratio	0.063	0.174	0.098	0.117	0.226
HCM Control Delay	8.3	8.6	8	8.2	8.9
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.6	0.3	0.4	0.9

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	0	0	102	21	0	34	64	182	24	61	252	1
Future Vol, veh/h	0	0	102	21	0	34	64	182	24	61	252	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	113	23	0	38	71	202	27	68	280	1

Major/Minor	Minor2	Minor1		Major1			Major2					
Conflicting Flow All	-	787	280	831	775	216	281	0	0	229	0	0
Stage 1	-	416	-	358	358	-	-	-	-	-	-	-
Stage 2	-	371	-	473	417	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	324	759	289	329	824	1282	-	-	1339	-	-
Stage 1	0	592	-	660	628	-	-	-	-	-	-	-
Stage 2	0	620	-	572	591	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	291	759	226	295	824	1282	-	-	1339	-	-
Mov Cap-2 Maneuver	-	291	-	226	295	-	-	-	-	-	-	-
Stage 1	-	562	-	624	593	-	-	-	-	-	-	-
Stage 2	-	586	-	462	561	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	14.6	1.9	1.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1282	-	-	759	226	824	1339	-	-
HCM Lane V/C Ratio	0.055	-	-	0.149	0.103	0.046	0.051	-	-
HCM Control Delay (s)	8	-	-	10.6	22.8	9.6	7.8	-	-
HCM Lane LOS	A	-	-	B	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0.3	0.1	0.2	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↑	↑↑	
Traffic Vol, veh/h	15	33	8	253	371	13
Future Vol, veh/h	15	33	8	253	371	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	38	9	294	431	15

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	751	223	446	0	-	0
Stage 1	439	-	-	-	-	-
Stage 2	312	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	362	781	1112	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	359	781	1112	-	-	-
Mov Cap-2 Maneuver	531	-	-	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	741	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1112	-	531	781	-	-
HCM Lane V/C Ratio	0.008	-	0.033	0.049	-	-
HCM Control Delay (s)	8.3	-	12	9.8	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	11	22	2	11	14	38	3	170	11	82	268	16
Future Vol, veh/h	11	22	2	11	14	38	3	170	11	82	268	16
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	25	2	13	16	44	3	195	13	94	308	18
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9	8.8	10.1	11.2
HCM LOS	A	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	31%	17%	100%	0%
Vol Thru, %	0%	94%	63%	22%	0%	94%
Vol Right, %	0%	6%	6%	60%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	181	35	63	82	284
LT Vol	3	0	11	11	82	0
Through Vol	0	170	22	14	0	268
RT Vol	0	11	2	38	0	16
Lane Flow Rate	3	208	40	72	94	326
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.005	0.299	0.062	0.103	0.144	0.451
Departure Headway (Hd)	5.722	5.176	5.533	5.124	5.514	4.972
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	624	693	644	696	649	721
Service Time	3.472	2.926	3.597	3.182	3.258	2.715
HCM Lane V/C Ratio	0.005	0.3	0.062	0.103	0.145	0.452
HCM Control Delay	8.5	10.1	9	8.8	9.2	11.8
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0	1.3	0.2	0.3	0.5	2.4

Intersection						
Int Delay, s/veh	7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	22	134	79	157	225	42
Future Vol, veh/h	22	134	79	157	225	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	151	89	176	253	47

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	89	0	-	0	290 89
Stage 1	-	-	-	-	89 -
Stage 2	-	-	-	-	201 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1506	-	-	0	701 969
Stage 1	-	-	-	0	934 -
Stage 2	-	-	-	0	833 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1506	-	-	-	689 969
Mov Cap-2 Maneuver	-	-	-	-	689 -
Stage 1	-	-	-	-	918 -
Stage 2	-	-	-	-	833 -

Approach	EB	WB	SB
HCM Control Delay, s	1	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1506	-	-	689	969
HCM Lane V/C Ratio	0.016	-	-	0.367	0.049
HCM Control Delay (s)	7.4	-	-	13.2	8.9
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.7	0.2

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	184	281	0
Future Vol, veh/h	0	0	0	184	281	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	214	327	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	541	327	327	0	-	0
Stage 1	327	-	-	-	-	-
Stage 2	214	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	502	714	1233	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	502	714	1233	-	-	-
Mov Cap-2 Maneuver	644	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	822	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1233	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	35	0	0	33	0	0
Future Vol, veh/h	35	0	0	33	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	0	0	36	0	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	38	0	74
Stage 1	-	-	-	-	38
Stage 2	-	-	-	-	36
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1572	-	930
Stage 1	-	-	-	-	984
Stage 2	-	-	-	-	986
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1572	-	930
Mov Cap-2 Maneuver	-	-	-	-	930
Stage 1	-	-	-	-	984
Stage 2	-	-	-	-	986

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1572	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	56	0	0	55	1	0	0	0	0	0	0
Future Vol, veh/h	0	56	0	0	55	1	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	72	0	0	71	1	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	72	0	0	72	0	0	144	144	72	144	144	72
Stage 1	-	-	-	-	-	-	72	72	-	72	72	-
Stage 2	-	-	-	-	-	-	72	72	-	72	72	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1528	-	-	1528	-	-	825	747	990	825	747	990
Stage 1	-	-	-	-	-	-	938	835	-	938	835	-
Stage 2	-	-	-	-	-	-	938	835	-	938	835	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1528	-	-	1528	-	-	825	747	990	825	747	990
Mov Cap-2 Maneuver	-	-	-	-	-	-	825	747	-	825	747	-
Stage 1	-	-	-	-	-	-	938	835	-	938	835	-
Stage 2	-	-	-	-	-	-	938	835	-	938	835	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			0			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1528	-	-	1528	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	1.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	85	33	2	87	34	10
Future Vol, veh/h	85	33	2	87	34	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	120	46	3	123	48	14

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	166	0	249
Stage 1	-	-	-	-	120
Stage 2	-	-	-	-	129
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1412	-	739
Stage 1	-	-	-	-	905
Stage 2	-	-	-	-	897
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1412	-	738
Mov Cap-2 Maneuver	-	-	-	-	738
Stage 1	-	-	-	-	905
Stage 2	-	-	-	-	895

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	774	-	-	1412	-
HCM Lane V/C Ratio	0.08	-	-	0.002	-
HCM Control Delay (s)	10.1	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	↕
Traffic Vol, veh/h	60	33	25	20	24	61
Future Vol, veh/h	60	33	25	20	24	61
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	50	38	30	36	92
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.4	7.5	7.9
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	65%	0%	100%	0%
Vol Thru, %	35%	56%	0%	0%
Vol Right, %	0%	44%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	45	24	61
LT Vol	60	0	24	0
Through Vol	33	25	0	0
RT Vol	0	20	0	61
Lane Flow Rate	141	68	36	92
Geometry Grp	2	2	7	7
Degree of Util (X)	0.174	0.078	0.056	0.111
Departure Headway (Hd)	4.436	4.124	5.51	4.305
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	812	871	653	836
Service Time	2.447	2.137	3.221	2.017
HCM Lane V/C Ratio	0.174	0.078	0.055	0.11
HCM Control Delay	8.4	7.5	8.5	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.3	0.2	0.4

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A







Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	26	25	60	47	60
Future Vol, veh/h	82	26	25	60	47	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	35	33	80	63	80
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.5	8.4	7.8
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	29%	76%	0%	0%
Vol Thru, %	71%	0%	100%	0%
Vol Right, %	0%	24%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	85	108	47	60
LT Vol	25	82	0	0
Through Vol	60	0	47	0
RT Vol	0	26	0	60
Lane Flow Rate	113	144	63	80
Geometry Grp	5	2	7	7
Degree of Util (X)	0.145	0.181	0.087	0.095
Departure Headway (Hd)	4.592	4.521	4.974	4.271
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	783	795	723	841
Service Time	2.61	2.54	2.69	1.987
HCM Lane V/C Ratio	0.144	0.181	0.087	0.095
HCM Control Delay	8.4	8.5	8.2	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.7	0.3	0.3













Queues  
24: Brunswick Rd & Loma Rica Dr

Existing 1830  
01/11/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	25	224	25	110	365
v/c Ratio	0.09	0.04	0.23	0.03	0.18	0.25
Control Delay	16.0	3.5	11.3	6.5	14.2	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	3.5	11.3	6.5	14.2	3.3
Queue Length 50th (ft)	6	0	23	0	13	0
Queue Length 95th (ft)	35	9	103	13	63	77
Internal Link Dist (ft)	1061		948			683
Turn Bay Length (ft)	165			405	410	
Base Capacity (vph)	1055	1249	1542	1314	1206	1810
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.15	0.02	0.09	0.20
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Existing 1830  
 01/11/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	23	206	23	101	336
Future Volume (veh/h)	42	23	206	23	101	336
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	46	25	224	25	110	365
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	131	274	503	426	177	1011
Arrive On Green	0.08	0.08	0.28	0.28	0.10	0.55
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	46	25	224	25	110	365
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.7	0.4	2.9	0.3	1.7	3.2
Cycle Q Clear(g_c), s	0.7	0.4	2.9	0.3	1.7	3.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	131	274	503	426	177	1011
V/C Ratio(X)	0.35	0.09	0.45	0.06	0.62	0.36
Avail Cap(c_a), veh/h	850	914	1912	1620	1200	3115
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	9.9	8.6	7.7	12.4	3.6
Incr Delay (d2), s/veh	1.6	0.1	0.6	0.1	3.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.1	0.7	0.1	0.6	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.3	10.1	9.3	7.8	16.0	3.8
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	71		249			475
Approach Delay, s/veh	12.8		9.1			6.6
Approach LOS	B		A			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.0	13.7			21.8	7.1
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	3.7	4.9			5.2	2.7
Green Ext Time (p_c), s	0.2	1.2			2.1	0.1
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.0			
HCM 6th LOS			A			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	6.1	10.6	4.8	6.6

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	1.3	0.0	0.5
Total Del/Veh (s)	5.4	6.6	10.4	7.0

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.2
Total Del/Veh (s)	6.3	7.9	0.9	4.1

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.1
Total Del/Veh (s)	17.9	6.2	10.3	9.8	8.7

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.4	2.9	0.7
Total Del/Veh (s)	8.3	13.8	13.5	35.6	16.7

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	4.5	24.6	9.2

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.5	0.0	0.4
Total Del/Veh (s)	8.7	15.2	12.3	3.2	9.1

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	1.9	0.8
Total Del/Veh (s)	9.5	9.2	5.5	7.8



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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.9	0.0	0.1	0.8
Total Del/Veh (s)	5.0	5.3	5.9	5.3

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Total Zone Performance

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Denied Del/Veh (s)	1.2
Total Del/Veh (s)	170.0

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	104	107	66	76
Average Queue (ft)	56	46	28	29
95th Queue (ft)	97	87	58	59
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	4			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	108	66	90	87	75
Average Queue (ft)	60	24	39	42	31
95th Queue (ft)	99	55	74	73	62
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	89	66	33	60	16
Average Queue (ft)	46	36	9	31	1
95th Queue (ft)	74	57	32	48	6
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	51	53	76	94	5	94	61	84	116	73
Average Queue (ft)	16	20	31	31	0	43	29	21	59	27
95th Queue (ft)	43	46	60	66	4	78	56	60	98	60
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)				0						
Queuing Penalty (veh)				0						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	123	147	99	131	114	58	105	137	154	53	62
Average Queue (ft)	30	63	53	31	43	20	49	40	83	16	29
95th Queue (ft)	80	122	91	92	99	51	83	99	136	44	53
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	1	1						
Queuing Penalty (veh)	0	0	0	1	1						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	1			0				
Queuing Penalty (veh)			1	1			0				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	61	70	34	51	199	109	50
Average Queue (ft)	9	18	3	5	107	51	2
95th Queue (ft)	35	50	20	29	178	87	23
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					4	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	56	74	90	98	110	80	80	130	75	135	101	67
Average Queue (ft)	15	34	34	47	48	37	37	57	20	65	38	23
95th Queue (ft)	44	65	71	84	82	68	70	103	52	109	76	56
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	63
Average Queue (ft)	25
95th Queue (ft)	55
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	78	69	41	30	50	45	67	47
Average Queue (ft)	29	27	9	7	17	13	28	15
95th Queue (ft)	61	61	31	25	40	39	58	38
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	78	55	59	59	54	55	52
Average Queue (ft)	29	20	23	15	9	20	26
95th Queue (ft)	62	42	53	43	35	48	44
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 8

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

1830-1930 PM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	36	3.0	0.085	4.4	LOS A	0.4	9.0	0.42	0.29	0.42	34.3
8	T1	35	3.0	0.085	4.4	LOS A	0.4	9.0	0.42	0.29	0.42	34.3
18	R2	14	3.0	0.085	4.4	LOS A	0.4	9.0	0.42	0.29	0.42	33.3
Approach		85	3.0	0.085	4.4	LOS A	0.4	9.0	0.42	0.29	0.42	34.1
East: Idaho Maryland Rd												
1	L2	142	3.0	0.127	4.3	LOS A	0.5	13.2	0.35	0.23	0.35	32.8
6	T1	158	3.0	0.225	5.3	LOS A	1.0	25.5	0.39	0.27	0.39	35.0
16	R2	92	3.0	0.225	5.3	LOS A	1.0	25.5	0.39	0.27	0.39	33.9
Approach		392	3.0	0.225	5.0	LOS A	1.0	25.5	0.38	0.26	0.38	33.9
North: Main St												
7	L2	51	3.0	0.202	5.4	LOS A	0.8	20.5	0.43	0.34	0.43	34.4
4	T1	156	3.0	0.202	5.4	LOS A	0.8	20.5	0.43	0.34	0.43	34.3
14	R2	210	3.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		417	3.0	0.202	2.7	LOS A	0.8	20.5	0.21	0.17	0.21	35.7
West: Main St												
5	L2	160	3.0	0.254	6.0	LOS A	1.1	27.0	0.46	0.38	0.46	33.0
2	T1	75	3.0	0.254	6.0	LOS A	1.1	27.0	0.46	0.38	0.46	33.0
12	R2	24	3.0	0.254	6.0	LOS A	1.1	27.0	0.46	0.38	0.46	32.1
Approach		258	3.0	0.254	6.0	LOS A	1.1	27.0	0.46	0.38	0.46	32.9
All Vehicles		1151	3.0	0.254	4.3	LOS A	1.1	27.0	0.34	0.25	0.34	34.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Intersection	
Intersection Delay, s/veh	19.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	57	313	4	0	0	0	0	175	249	146	241	0
Future Vol, veh/h	57	313	4	0	0	0	0	175	249	146	241	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	344	4	0	0	0	0	192	274	160	265	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.8	28.7	14.6
HCM LOS	B	D	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	27%	0%	100%	0%
Vol Thru, %	41%	73%	98%	0%	100%
Vol Right, %	59%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	424	214	161	146	241
LT Vol	0	57	0	146	0
Through Vol	175	157	157	0	241
RT Vol	249	0	4	0	0
Lane Flow Rate	466	235	176	160	265
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.792	0.464	0.341	0.317	0.485
Departure Headway (Hd)	6.122	7.118	6.964	7.105	6.595
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	592	504	515	504	543
Service Time	4.181	4.886	4.732	4.877	4.366
HCM Lane V/C Ratio	0.787	0.466	0.342	0.317	0.488
HCM Control Delay	28.7	16	13.3	13.2	15.5
HCM Lane LOS	D	C	B	B	C
HCM 95th-tile Q	7.6	2.4	1.5	1.3	2.6



**Intersection**

Intersection Delay, s/veh 23.4  
Intersection LOS C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	287	48	44	365	268	439
Future Vol, veh/h	287	48	44	365	268	439
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	309	52	47	392	288	472
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	24	16.6	27
HCM LOS	C	C	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	27%	0%
Vol Thru, %	0%	0%	86%	73%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	268	439	335	166	243
LT Vol	268	0	0	44	0
Through Vol	0	0	287	122	243
RT Vol	0	439	48	0	0
Lane Flow Rate	288	472	360	178	262
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.595	0.815	0.689	0.368	0.531
Departure Headway (Hd)	7.435	6.212	6.881	7.438	7.302
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	484	581	522	481	492
Service Time	5.211	3.987	4.951	5.223	5.087
HCM Lane V/C Ratio	0.595	0.812	0.69	0.37	0.533
HCM Control Delay	20.6	30.9	24	14.5	18.1
HCM Lane LOS	C	D	C	B	C
HCM 95th-tile Q	3.8	8.2	5.3	1.7	3.1

**Intersection**

Intersection Delay, s/veh	13
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	589	122	22	331	82	30
Future Vol, veh/h	589	122	22	331	82	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	620	128	23	348	86	32
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.2	11.2	10.7
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	73%	0%	0%	17%	0%
Vol Thru, %	0%	100%	62%	83%	100%
Vol Right, %	27%	0%	38%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	112	393	318	132	221
LT Vol	82	0	0	22	0
Through Vol	0	393	196	110	221
RT Vol	30	0	122	0	0
Lane Flow Rate	118	413	335	139	232
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.201	0.605	0.465	0.226	0.371
Departure Headway (Hd)	6.147	5.271	5.001	5.833	5.749
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	586	678	710	620	629
Service Time	4.159	3.066	2.795	3.533	3.449
HCM Lane V/C Ratio	0.201	0.609	0.472	0.224	0.369
HCM Control Delay	10.7	15.9	12.1	10.2	11.8
HCM Lane LOS	B	C	B	B	B
HCM 95th-tile Q	0.7	4.1	2.5	0.9	1.7

Intersection												
Int Delay, s/veh	14.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗			↖	↗	↖	↗	↖	↗	↖	↗
Traffic Vol, veh/h	0	0	166	64	0	107	219	456	19	38	323	8
Future Vol, veh/h	0	0	166	64	0	107	219	456	19	38	323	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	177	68	0	114	233	485	20	40	344	9

Major/Minor	Minor2	Minor1		Major1			Major2					
Conflicting Flow All	-	1395	344	1478	1394	495	353	0	0	505	0	0
Stage 1	-	424	-	961	961	-	-	-	-	-	-	-
Stage 2	-	971	-	517	433	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	141	699	104	141	575	1206	-	-	1060	-	-
Stage 1	0	587	-	308	335	-	-	-	-	-	-	-
Stage 2	0	331	-	541	582	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	109	699	~ 64	109	575	1206	-	-	1060	-	-
Mov Cap-2 Maneuver	-	109	-	~ 64	109	-	-	-	-	-	-	-
Stage 1	-	565	-	249	270	-	-	-	-	-	-	-
Stage 2	-	267	-	389	560	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.9	97.9	2.7	0.9
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1206	-	-	699	64	575	1060	-	-
HCM Lane V/C Ratio	0.193	-	-	0.253	1.064	0.198	0.038	-	-
HCM Control Delay (s)	8.7	-	-	11.9	240.3	12.8	8.5	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	1	5.3	0.7	0.1	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	45	69	675	445	90
Future Vol, veh/h	22	45	69	675	445	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	50	77	750	494	100

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1448	297	594	0	-	0
Stage 1	544	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	133	700	980	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	394	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	122	700	980	-	-	-
Mov Cap-2 Maneuver	315	-	-	-	-	-
Stage 1	504	-	-	-	-	-
Stage 2	394	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.8	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	980	-	315	700	-	-
HCM Lane V/C Ratio	0.078	-	0.078	0.071	-	-
HCM Control Delay (s)	9	-	17.4	10.5	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	0.2	-	-

Intersection	
Intersection Delay, s/veh	29.1
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	31	23	12	28	57	182	20	484	13	61	200	27
Future Vol, veh/h	31	23	12	28	57	182	20	484	13	61	200	27
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	25	13	30	61	196	22	520	14	66	215	29
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11.6	15.5	46.8	13.9
HCM LOS	B	C	E	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	10%	100%	0%
Vol Thru, %	0%	97%	35%	21%	0%	88%
Vol Right, %	0%	3%	18%	68%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	497	66	267	61	227
LT Vol	20	0	31	28	61	0
Through Vol	0	484	23	57	0	200
RT Vol	0	13	12	182	0	27
Lane Flow Rate	22	534	71	287	66	244
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.041	0.937	0.144	0.5	0.131	0.448
Departure Headway (Hd)	6.841	6.312	7.324	6.265	7.207	6.61
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	527	577	488	574	497	544
Service Time	4.541	4.012	5.396	4.313	4.96	4.362
HCM Lane V/C Ratio	0.042	0.925	0.145	0.5	0.133	0.449
HCM Control Delay	9.8	48.3	11.6	15.5	11.1	14.7
HCM Lane LOS	A	E	B	C	B	B
HCM 95th-tile Q	0.1	12.1	0.5	2.8	0.4	2.3

Intersection						
Int Delay, s/veh	6.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	112	160	263	389	149	101
Future Vol, veh/h	112	160	263	389	149	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	119	170	280	414	159	107

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	280	0	-	0	688 280
Stage 1	-	-	-	-	280 -
Stage 2	-	-	-	-	408 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1283	-	-	0	412 759
Stage 1	-	-	-	0	767 -
Stage 2	-	-	-	0	671 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1283	-	-	-	374 759
Mov Cap-2 Maneuver	-	-	-	-	374 -
Stage 1	-	-	-	-	696 -
Stage 2	-	-	-	-	671 -

Approach	EB	WB	SB
HCM Control Delay, s	3.3	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1283	-	-	374	759
HCM Lane V/C Ratio	0.093	-	-	0.424	0.142
HCM Control Delay (s)	8.1	-	-	21.5	10.5
HCM Lane LOS	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	2.1	0.5

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	
Traffic Vol, veh/h	0	0	0	517	240	0
Future Vol, veh/h	0	0	0	517	240	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	539	250	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	789	250	250	0	-	0
Stage 1	250	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	359	789	1316	-	-	-
Stage 1	792	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	359	789	1316	-	-	-
Mov Cap-2 Maneuver	523	-	-	-	-	-
Stage 1	792	-	-	-	-	-
Stage 2	585	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1316	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	66	0	0	104	0	0
Future Vol, veh/h	66	0	0	104	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	0	0	113	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	72	0	185 72
Stage 1	-	-	-	-	72 -
Stage 2	-	-	-	-	113 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1528	-	804 990
Stage 1	-	-	-	-	951 -
Stage 2	-	-	-	-	912 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1528	-	804 990
Mov Cap-2 Maneuver	-	-	-	-	804 -
Stage 1	-	-	-	-	951 -
Stage 2	-	-	-	-	912 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1528	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-



Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	309	0	0	106	0	0	0	0	0	0	0
Future Vol, veh/h	0	309	0	0	106	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	368	0	0	126	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	126	0	0	368	0	0	494	494	368	494	494	126
Stage 1	-	-	-	-	-	-	368	368	-	126	126	-
Stage 2	-	-	-	-	-	-	126	126	-	368	368	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1460	-	-	1191	-	-	486	476	677	486	476	924
Stage 1	-	-	-	-	-	-	652	621	-	878	792	-
Stage 2	-	-	-	-	-	-	878	792	-	652	621	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1460	-	-	1191	-	-	486	476	677	486	476	924
Mov Cap-2 Maneuver	-	-	-	-	-	-	486	476	-	486	476	-
Stage 1	-	-	-	-	-	-	652	621	-	878	792	-
Stage 2	-	-	-	-	-	-	878	792	-	652	621	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			0			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1460	-	-	1191	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	216	236	26	214	74	12
Future Vol, veh/h	216	236	26	214	74	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	223	243	27	221	76	12

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	466	0	498 223
Stage 1	-	-	-	-	223 -
Stage 2	-	-	-	-	275 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1095	-	532 817
Stage 1	-	-	-	-	814 -
Stage 2	-	-	-	-	771 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1095	-	519 817
Mov Cap-2 Maneuver	-	-	-	-	519 -
Stage 1	-	-	-	-	814 -
Stage 2	-	-	-	-	752 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	12.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	547	-	-	1095	-
HCM Lane V/C Ratio	0.162	-	-	0.024	-
HCM Control Delay (s)	12.9	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	109	109	111	88	38	123
Future Vol, veh/h	109	109	111	88	38	123
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	128	131	104	45	145
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	10.3	9.3	9
HCM LOS	B	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	50%	0%	100%	0%
Vol Thru, %	50%	56%	0%	0%
Vol Right, %	0%	44%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	218	199	38	123
LT Vol	109	0	38	0
Through Vol	109	111	0	0
RT Vol	0	88	0	123
Lane Flow Rate	256	234	45	145
Geometry Grp	2	2	7	7
Degree of Util (X)	0.34	0.29	0.076	0.199
Departure Headway (Hd)	4.772	4.453	6.15	4.939
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	751	805	581	722
Service Time	2.817	2.496	3.908	2.696
HCM Lane V/C Ratio	0.341	0.291	0.077	0.201
HCM Control Delay	10.3	9.3	9.4	8.9
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.5	1.2	0.2	0.7

**Intersection**

Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	97	56	87	84	88	79
Future Vol, veh/h	97	56	87	84	88	79
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	108	62	97	93	98	88
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.1	9.4	8.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	51%	63%	0%	0%
Vol Thru, %	49%	0%	100%	0%
Vol Right, %	0%	37%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	171	153	88	79
LT Vol	87	97	0	0
Through Vol	84	0	88	0
RT Vol	0	56	0	79
Lane Flow Rate	190	170	98	88
Geometry Grp	5	2	7	7
Degree of Util (X)	0.251	0.222	0.139	0.108
Departure Headway (Hd)	4.758	4.704	5.118	4.413
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	754	763	700	811
Service Time	2.791	2.735	2.85	2.145
HCM Lane V/C Ratio	0.252	0.223	0.14	0.109
HCM Control Delay	9.4	9.1	8.7	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1	0.8	0.5	0.4

Queues  
24: Brunswick Rd & Loma Rica Dr

EPAP AM Peak  
01/11/2021















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	59	198	611	147	299	254
v/c Ratio	0.26	0.30	0.79	0.20	0.66	0.17
Control Delay	31.9	6.4	27.2	3.9	31.1	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	6.4	27.2	3.9	31.1	2.9
Queue Length 50th (ft)	24	18	226	0	120	26
Queue Length 95th (ft)	59	54	#449	33	212	54
Internal Link Dist (ft)	926		735			673
Turn Bay Length (ft)	165			405	410	
Base Capacity (vph)	439	797	990	908	619	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.25	0.62	0.16	0.48	0.17

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP AM Peak  
 01/11/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	182	562	135	275	234
Future Volume (veh/h)	54	182	562	135	275	234
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	59	198	611	147	299	254
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	236	529	714	605	359	1248
Arrive On Green	0.14	0.14	0.39	0.39	0.21	0.68
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	59	198	611	147	299	254
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	1.8	5.7	18.1	3.8	9.8	3.0
Cycle Q Clear(g_c), s	1.8	5.7	18.1	3.8	9.8	3.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	236	529	714	605	359	1248
V/C Ratio(X)	0.25	0.37	0.86	0.24	0.83	0.20
Avail Cap(c_a), veh/h	414	688	932	789	585	1518
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.9	14.7	16.5	12.1	22.5	3.4
Incr Delay (d2), s/veh	0.5	0.4	6.3	0.2	5.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.9	7.2	1.1	4.0	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.4	15.1	22.8	12.3	28.0	3.5
LnGrp LOS	C	B	C	B	C	A
Approach Vol, veh/h	257		758			553
Approach Delay, s/veh	17.0		20.7			16.8
Approach LOS	B		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	17.3	29.0			46.3	12.9
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	11.8	20.1			5.0	7.7
Green Ext Time (p_c), s	0.5	3.0			1.4	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			18.7			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	8.8	23.9	5.8	12.6

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.2	0.0	0.6
Total Del/Veh (s)	5.3	8.8	15.7	9.8

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.2
Total Del/Veh (s)	8.5	9.1	1.1	6.1

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	1.9	1.0
Total Del/Veh (s)	14.6	8.2	11.9	12.3	10.4

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.8
Total Del/Veh (s)	9.7	12.8	13.9	34.0	17.4

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.6	7.5	24.5	12.7

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.4	0.0	0.3
Total Del/Veh (s)	11.4	19.3	17.2	5.0	12.8

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.4	1.7	0.9
Total Del/Veh (s)	18.0	18.4	11.5	15.0



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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	0.0	0.2	0.4
Total Del/Veh (s)	13.8	7.5	13.5	10.0

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Total Zone Performance

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Denied Del/Veh (s)	1.1
Total Del/Veh (s)	320.8

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	106	276	107	73
Average Queue (ft)	71	119	47	31
95th Queue (ft)	113	226	88	60
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	5			
Queuing Penalty (veh)	14			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	129	120	188	119	96
Average Queue (ft)	55	42	81	68	46
95th Queue (ft)	104	91	144	110	84
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			2	0
Queuing Penalty (veh)	0			4	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	8		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	126	91	33	78	15
Average Queue (ft)	63	49	9	43	1
95th Queue (ft)	103	80	32	66	8
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	T	R	L	L	T
Maximum Queue (ft)	58	99	104	125	129	95	99	132	120
Average Queue (ft)	19	43	51	51	54	38	29	66	49
95th Queue (ft)	46	81	90	101	98	70	70	108	97
Link Distance (ft)	777	160	160	160	1486				1622
Upstream Blk Time (%)			0	0					
Queuing Penalty (veh)			0	0					
Storage Bay Dist (ft)						115	360	360	
Storage Blk Time (%)					0	0			
Queuing Penalty (veh)					0	0			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	152	171	102	179	170	72	100	160	180	85	108
Average Queue (ft)	48	75	62	59	75	18	46	71	109	28	44
95th Queue (ft)	111	147	105	145	148	52	80	146	170	67	79
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	2	3	3						
Queuing Penalty (veh)	0	1	0	9	8						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	3		0	0		0		
Queuing Penalty (veh)			4	3		0	0		0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	96	112	103	133	214	222	308
Average Queue (ft)	33	36	24	30	153	123	49
95th Queue (ft)	79	87	71	91	230	212	198
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					16	8	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	94	111	128	144	114	108	165	212	62	130	96	80
Average Queue (ft)	35	56	63	77	58	51	72	111	17	59	34	34
95th Queue (ft)	71	92	110	121	97	90	128	182	47	109	72	66
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)						0	1					
Queuing Penalty (veh)						0	1					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	82
Average Queue (ft)	32
95th Queue (ft)	67
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	117	194	79	113	132	143	260	141
Average Queue (ft)	52	95	25	55	58	38	122	36
95th Queue (ft)	98	164	59	98	109	91	207	93
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			0	0			1	0
Queuing Penalty (veh)			0	0			2	0

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	185	129	155	170	163	132	89
Average Queue (ft)	77	30	70	62	56	60	40
95th Queue (ft)	145	80	126	122	117	108	72
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)			0	0	0		
Queuing Penalty (veh)			0	0	0		
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	1	0					

Zone Summary

Zone wide Queuing Penalty: 58

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP AM Peak  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	36	3.0	0.249	7.7	LOS A	1.1	27.5	0.61	0.60	0.61	33.3
8	T1	67	3.0	0.249	7.7	LOS A	1.1	27.5	0.61	0.60	0.61	33.3
18	R2	83	3.0	0.249	7.7	LOS A	1.1	27.5	0.61	0.60	0.61	32.3
Approach		186	3.0	0.249	7.7	LOS A	1.1	27.5	0.61	0.60	0.61	32.8
East: Idaho Maryland Rd												
1	L2	233	3.0	0.241	6.1	LOS A	1.0	26.5	0.49	0.42	0.49	32.0
6	T1	136	3.0	0.419	8.5	LOS A	2.1	53.8	0.58	0.51	0.58	33.3
16	R2	270	3.0	0.419	8.5	LOS A	2.1	53.8	0.58	0.51	0.58	32.3
Approach		639	3.0	0.419	7.6	LOS A	2.1	53.8	0.54	0.48	0.54	32.4
North: Main St												
7	L2	129	3.0	0.323	7.1	LOS A	1.4	35.7	0.51	0.46	0.51	33.1
4	T1	183	3.0	0.323	7.1	LOS A	1.4	35.7	0.51	0.46	0.51	33.0
14	R2	207	3.0	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		519	3.0	0.323	4.3	LOS A	1.4	35.7	0.31	0.28	0.31	34.5
West: Main St												
5	L2	276	3.0	0.520	11.3	LOS B	3.6	90.9	0.67	0.79	1.00	30.7
2	T1	154	3.0	0.520	11.3	LOS B	3.6	90.9	0.67	0.79	1.00	30.7
12	R2	14	3.0	0.520	11.3	LOS B	3.6	90.9	0.67	0.79	1.00	29.9
Approach		444	3.0	0.520	11.3	LOS B	3.6	90.9	0.67	0.79	1.00	30.7
All Vehicles		1788	3.0	0.520	7.6	LOS A	3.6	90.9	0.51	0.51	0.60	32.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	15.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	60	282	1	0	0	0	0	119	156	174	329	0
Future Vol, veh/h	60	282	1	0	0	0	0	119	156	174	329	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	313	1	0	0	0	0	132	173	193	366	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14	15.9	17.2
HCM LOS	B	C	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	30%	0%	100%	0%
Vol Thru, %	43%	70%	99%	0%	100%
Vol Right, %	57%	0%	1%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	275	201	142	174	329
LT Vol	0	60	0	174	0
Through Vol	119	141	141	0	329
RT Vol	156	0	1	0	0
Lane Flow Rate	306	223	158	193	366
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.524	0.434	0.299	0.363	0.634
Departure Headway (Hd)	6.172	6.988	6.832	6.753	6.245
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	584	514	525	532	578
Service Time	4.225	4.744	4.587	4.508	3.999
HCM Lane V/C Ratio	0.524	0.434	0.301	0.363	0.633
HCM Control Delay	15.9	15	12.5	13.3	19.3
HCM Lane LOS	C	B	B	B	C
HCM 95th-tile Q	3	2.2	1.2	1.6	4.4

Intersection	
Intersection Delay, s/veh	31.2
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	215	53	66	732	169	227
Future Vol, veh/h	215	53	66	732	169	227
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	239	59	73	813	188	252
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	17.6	43.4	15.7
HCM LOS	C	E	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	21%	0%
Vol Thru, %	0%	0%	80%	79%	100%
Vol Right, %	0%	100%	20%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	169	227	268	310	488
LT Vol	169	0	0	66	0
Through Vol	0	0	215	244	488
RT Vol	0	227	53	0	0
Lane Flow Rate	188	252	298	344	542
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.413	0.469	0.55	0.631	0.978
Departure Headway (Hd)	7.914	6.687	6.644	6.599	6.491
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	454	537	542	544	558
Service Time	5.678	4.451	4.703	4.364	4.255
HCM Lane V/C Ratio	0.414	0.469	0.55	0.632	0.971
HCM Control Delay	16.2	15.3	17.6	20.1	58.2
HCM Lane LOS	C	C	C	C	F
HCM 95th-tile Q	2	2.5	3.3	4.4	13.5



Intersection	
Intersection Delay, s/veh	19.6
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Vol, veh/h	426	72	23	682	93	30
Future Vol, veh/h	426	72	23	682	93	30
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	490	83	26	784	107	34
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.4	24.6	12
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	76%	0%	0%	9%	0%
Vol Thru, %	0%	100%	66%	91%	100%
Vol Right, %	24%	0%	34%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	284	214	250	455
LT Vol	93	0	0	23	0
Through Vol	0	284	142	227	455
RT Vol	30	0	72	0	0
Lane Flow Rate	141	326	246	288	523
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.26	0.547	0.396	0.463	0.834
Departure Headway (Hd)	6.628	6.034	5.795	5.794	5.747
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	543	597	620	622	632
Service Time	4.665	3.771	3.533	3.526	3.48
HCM Lane V/C Ratio	0.26	0.546	0.397	0.463	0.828
HCM Control Delay	12	15.9	12.3	13.4	30.8
HCM Lane LOS	B	C	B	B	D
HCM 95th-tile Q	1	3.3	1.9	2.4	8.9

Intersection												
Int Delay, s/veh	9.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↘		↗	↘	↗		↗	↖	↗
Traffic Vol, veh/h	0	0	209	25	0	76	247	472	57	94	459	14
Future Vol, veh/h	0	0	209	25	0	76	247	472	57	94	459	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	50	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	215	26	0	78	255	487	59	97	473	14

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	-	473	1809	-	517	487	0	0	546	0	0
Stage 1	-	-	-	1027	-	-	-	-	-	-	-	-
Stage 2	-	-	-	782	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	7.12	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	6.12	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	3.518	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	591	61	0	558	1076	-	-	1023	-	-
Stage 1	0	0	-	283	0	-	-	-	-	-	-	-
Stage 2	0	0	-	387	0	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	591	29	-	558	1076	-	-	1023	-	-
Mov Cap-2 Maneuver	-	-	-	29	-	-	-	-	-	-	-	-
Stage 1	-	-	-	216	-	-	-	-	-	-	-	-
Stage 2	-	-	-	223	-	-	-	-	-	-	-	-

Approach	EB		WB		NB			SB		
HCM Control Delay, s	14.5		90.7		3			1.5		
HCM LOS	B		F							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1076	-	-	591	29	558	1023	-	-
HCM Lane V/C Ratio	0.237	-	-	0.365	0.889	0.14	0.095	-	-
HCM Control Delay (s)	9.4	-	-	14.5	328.3	12.5	8.9	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.9	-	-	1.7	2.9	0.5	0.3	-	-

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↑	↑↑	
Traffic Vol, veh/h	90	58	25	684	645	42
Future Vol, veh/h	90	58	25	684	645	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	95	61	26	720	679	44

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1473	362	723	0	-	0
Stage 1	701	-	-	-	-	-
Stage 2	772	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	128	635	877	-	-	-
Stage 1	454	-	-	-	-	-
Stage 2	455	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	124	635	877	-	-	-
Mov Cap-2 Maneuver	322	-	-	-	-	-
Stage 1	440	-	-	-	-	-
Stage 2	455	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.1	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	877	-	322	635	-	-
HCM Lane V/C Ratio	0.03	-	0.294	0.096	-	-
HCM Control Delay (s)	9.2	-	20.8	11.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.2	0.3	-	-

Intersection	
Intersection Delay, s/veh	22
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	20	29	19	25	44	85	9	320	36	153	493	33
Future Vol, veh/h	20	29	19	25	44	85	9	320	36	153	493	33
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	29	19	25	44	86	9	323	36	155	498	33
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11	11.9	17.8	27.6
HCM LOS	B	B	C	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	29%	16%	100%	0%
Vol Thru, %	0%	90%	43%	29%	0%	94%
Vol Right, %	0%	10%	28%	55%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	9	356	68	154	153	526
LT Vol	9	0	20	25	153	0
Through Vol	0	320	29	44	0	493
RT Vol	0	36	19	85	0	33
Lane Flow Rate	9	360	69	156	155	531
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.017	0.61	0.13	0.275	0.27	0.847
Departure Headway (Hd)	6.689	6.109	6.836	6.362	6.292	5.74
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	533	590	521	562	570	627
Service Time	4.453	3.872	4.927	4.437	4.044	3.493
HCM Lane V/C Ratio	0.017	0.61	0.132	0.278	0.272	0.847
HCM Control Delay	9.6	18	11	11.9	11.4	32.3
HCM Lane LOS	A	C	B	B	B	D
HCM 95th-tile Q	0.1	4.1	0.4	1.1	1.1	9.3

Intersection						
Int Delay, s/veh	38.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	74	226	239	262	393	110
Future Vol, veh/h	74	226	239	262	393	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	80	246	260	285	427	120

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	260	0	-	0	666 260
Stage 1	-	-	-	-	260 -
Stage 2	-	-	-	-	406 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1304	-	-	0 ~	425 779
Stage 1	-	-	-	0	783 -
Stage 2	-	-	-	0	673 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1304	-	-	- ~	399 779
Mov Cap-2 Maneuver	-	-	-	- ~	399 -
Stage 1	-	-	-	-	735 -
Stage 2	-	-	-	-	673 -

Approach	EB	WB	SB
HCM Control Delay, s	2	0	78.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1304	-	-	399	779
HCM Lane V/C Ratio	0.062	-	-	1.071	0.153
HCM Control Delay (s)	7.9	-	-	97.7	10.5
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	14.5	0.5

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	365	537	0
Future Vol, veh/h	0	0	0	365	537	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	397	584	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	981	584	584	0	-	0
Stage 1	584	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	277	512	991	-	-	-
Stage 1	557	-	-	-	-	-
Stage 2	679	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	277	512	991	-	-	-
Mov Cap-2 Maneuver	470	-	-	-	-	-
Stage 1	557	-	-	-	-	-
Stage 2	679	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	991	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	68	0	0	86	0	0
Future Vol, veh/h	68	0	0	86	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	0	0	93	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	74	0	167
Stage 1	-	-	-	-	74
Stage 2	-	-	-	-	93
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1526	-	823
Stage 1	-	-	-	-	949
Stage 2	-	-	-	-	931
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1526	-	823
Mov Cap-2 Maneuver	-	-	-	-	823
Stage 1	-	-	-	-	949
Stage 2	-	-	-	-	931

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1526	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	114	0	0	261	0	0	0	0	0	0	0
Future Vol, veh/h	0	114	0	0	261	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	152	0	0	348	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	348	0	0	152	0	0	500	500	152	500	500	348
Stage 1	-	-	-	-	-	-	152	152	-	348	348	-
Stage 2	-	-	-	-	-	-	348	348	-	152	152	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1211	-	-	1429	-	-	481	473	894	481	473	695
Stage 1	-	-	-	-	-	-	850	772	-	668	634	-
Stage 2	-	-	-	-	-	-	668	634	-	850	772	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1211	-	-	1429	-	-	481	473	894	481	473	695
Mov Cap-2 Maneuver	-	-	-	-	-	-	481	473	-	481	473	-
Stage 1	-	-	-	-	-	-	850	772	-	668	634	-
Stage 2	-	-	-	-	-	-	668	634	-	850	772	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	0	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1211	-	-	1429	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-



Intersection						
Int Delay, s/veh	25.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	299	120	12	385	245	37
Future Vol, veh/h	299	120	12	385	245	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	374	150	15	481	306	46

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	524	0	885 374
Stage 1	-	-	-	-	374 -
Stage 2	-	-	-	-	511 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1043	-	315 672
Stage 1	-	-	-	-	696 -
Stage 2	-	-	-	-	602 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1043	-	311 672
Mov Cap-2 Maneuver	-	-	-	-	311 -
Stage 1	-	-	-	-	696 -
Stage 2	-	-	-	-	594 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	99.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	335	-	-	1043	-
HCM Lane V/C Ratio	1.052	-	-	0.014	-
HCM Control Delay (s)	99.8	-	-	8.5	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	12.6	-	-	0	-

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	↕
Traffic Vol, veh/h	212	110	199	67	107	208
Future Vol, veh/h	212	110	199	67	107	208
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	249	129	234	79	126	245
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	16.2	13.2	11.9
HCM LOS	C	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	66%	0%	100%	0%
Vol Thru, %	34%	75%	0%	0%
Vol Right, %	0%	25%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	322	266	107	208
LT Vol	212	0	107	0
Through Vol	110	199	0	0
RT Vol	0	67	0	208
Lane Flow Rate	379	313	126	245
Geometry Grp	2	2	7	7
Degree of Util (X)	0.586	0.47	0.241	0.385
Departure Headway (Hd)	5.573	5.407	6.885	5.666
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	648	667	521	634
Service Time	3.612	3.449	4.627	3.407
HCM Lane V/C Ratio	0.585	0.469	0.242	0.386
HCM Control Delay	16.2	13.2	11.8	11.9
HCM Lane LOS	C	B	B	B
HCM 95th-tile Q	3.8	2.5	0.9	1.8

**Intersection**

Intersection Delay, s/veh 15.6  
Intersection LOS C







Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	144	186	125	172	179	179
Future Vol, veh/h	144	186	125	172	179	179
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	224	151	207	216	216
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	17.9	17.4	12.1
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	42%	44%	0%	0%
Vol Thru, %	58%	0%	100%	0%
Vol Right, %	0%	56%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	297	330	179	179
LT Vol	125	144	0	0
Through Vol	172	0	179	0
RT Vol	0	186	0	179
Lane Flow Rate	358	398	216	216
Geometry Grp	5	2	7	7
Degree of Util (X)	0.592	0.627	0.377	0.335
Departure Headway (Hd)	5.951	5.673	6.301	5.588
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	632	569	641
Service Time	4.012	3.731	4.067	3.354
HCM Lane V/C Ratio	0.592	0.63	0.38	0.337
HCM Control Delay	17.4	17.9	12.9	11.2
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	3.9	4.4	1.7	1.5













Queues  
24: Brunswick Rd & Loma Rica Dr

EPAP PM Peak  
01/11/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	358	413	49	132	579
v/c Ratio	0.46	0.45	0.65	0.09	0.39	0.46
Control Delay	27.9	5.4	21.6	5.3	26.5	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	5.4	21.6	5.3	26.5	7.1
Queue Length 50th (ft)	45	16	111	0	38	90
Queue Length 95th (ft)	125	75	237	19	102	174
Internal Link Dist (ft)	1009		858			663
Turn Bay Length (ft)	165			505	410	
Base Capacity (vph)	510	1080	1115	966	720	1664
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.33	0.37	0.05	0.18	0.35
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP PM Peak  
 01/11/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	146	329	380	45	121	533
Future Volume (veh/h)	146	329	380	45	121	533
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	159	358	413	49	132	579
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	439	546	547	463	174	935
Arrive On Green	0.25	0.25	0.30	0.30	0.10	0.51
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	159	358	413	49	132	579
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	3.4	8.8	9.3	1.0	3.4	10.3
Cycle Q Clear(g_c), s	3.4	8.8	9.3	1.0	3.4	10.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	439	546	547	463	174	935
V/C Ratio(X)	0.36	0.66	0.76	0.11	0.76	0.62
Avail Cap(c_a), veh/h	540	635	1214	1029	762	1978
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.0	12.4	14.4	11.5	19.9	7.9
Incr Delay (d2), s/veh	0.5	2.0	2.2	0.1	6.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.8	3.1	0.3	1.4	2.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.5	14.3	16.6	11.6	26.5	8.6
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	517		462			711
Approach Delay, s/veh	14.4		16.0			11.9
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.7	19.4			29.1	16.4
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	5.4	11.3			12.3	10.8
Green Ext Time (p_c), s	0.3	2.3			3.8	0.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			13.8			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	10.4	22.5	6.0	11.5

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.0	0.0	0.4
Total Del/Veh (s)	5.9	8.9	18.3	10.5

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.5	0.3
Total Del/Veh (s)	11.8	10.3	1.9	7.4

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.2
Total Del/Veh (s)	17.3	10.5	17.7	17.1	14.7

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.7	0.8
Total Del/Veh (s)	14.8	14.6	21.4	37.6	21.4

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.3	9.6	26.8	13.5

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.5	0.0	0.4
Total Del/Veh (s)	17.1	34.6	29.2	12.7	23.1

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	2.7	0.9
Total Del/Veh (s)	12.9	14.6	13.2	13.6

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.7	0.0	0.2	1.2
Total Del/Veh (s)	18.9	11.3	16.0	15.5

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Total Zone Performance

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Denied Del/Veh (s)	1.4
Total Del/Veh (s)	704.8



Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	112	223	101	108
Average Queue (ft)	76	99	47	48
95th Queue (ft)	119	185	90	89
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	7			
Queuing Penalty (veh)	21			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	143	108	195	123	110
Average Queue (ft)	84	33	85	77	61
95th Queue (ft)	140	77	154	120	105
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			5	1
Queuing Penalty (veh)	4			7	2
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	6		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	158	153	49	82	33
Average Queue (ft)	78	68	17	41	4
95th Queue (ft)	127	118	43	65	20
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	40	112	114	168	31	239	139	192	209	151
Average Queue (ft)	12	49	49	83	2	99	67	74	116	60
95th Queue (ft)	37	93	91	152	18	193	130	161	187	123
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	0						
Queuing Penalty (veh)		0	0	1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						5	1			
Queuing Penalty (veh)						8	3			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	182	194	102	173	177	102	196	212	224	104	104
Average Queue (ft)	99	138	61	58	100	33	87	114	141	40	47
95th Queue (ft)	183	211	101	135	181	79	161	188	200	87	81
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	7	2	3	7						
Queuing Penalty (veh)	3	24	0	9	25						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	3		0	7	0	0		
Queuing Penalty (veh)			5	3		1	2	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	159	163	191	254	93	214	232	311
Average Queue (ft)	55	59	59	79	4	140	164	68
95th Queue (ft)	123	126	150	190	60	220	249	236
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	12	23	
Queuing Penalty (veh)				0	0	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	126	146	199	199	185	185	246	327	252	310	204	146
Average Queue (ft)	59	81	103	113	93	88	120	191	92	170	89	63
95th Queue (ft)	107	126	171	179	159	157	208	287	202	263	165	118
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)			0	0		3	7		0	1		
Queuing Penalty (veh)			0	0		10	10		0	2		

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	116
Average Queue (ft)	52
95th Queue (ft)	94
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	188	218	140	150	155	96	131	126
Average Queue (ft)	83	102	65	54	73	41	61	54
95th Queue (ft)	153	193	120	112	134	80	109	95
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	0	3						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			0	0				
Queuing Penalty (veh)			1	0				

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	441	180	216	131	130	199	83
Average Queue (ft)	176	106	110	41	38	94	35
95th Queue (ft)	371	202	186	99	96	161	64
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)	1		0				
Queuing Penalty (veh)	0		1				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	9	1					
Queuing Penalty (veh)	34	4					

Zone Summary

Zone wide Queuing Penalty: 189

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP PM Peak  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	75	3.0	0.244	6.5	LOS A	1.1	28.4	0.54	0.46	0.54	33.5
8	T1	71	3.0	0.244	6.5	LOS A	1.1	28.4	0.54	0.46	0.54	33.4
18	R2	73	3.0	0.244	6.5	LOS A	1.1	28.4	0.54	0.46	0.54	32.5
Approach		218	3.0	0.244	6.5	LOS A	1.1	28.4	0.54	0.46	0.54	33.1
East: Idaho Maryland Rd												
1	L2	335	3.0	0.338	7.2	LOS A	1.6	40.7	0.52	0.44	0.52	31.6
6	T1	249	3.0	0.485	9.4	LOS A	3.1	79.2	0.60	0.57	0.69	32.9
16	R2	234	3.0	0.485	9.4	LOS A	3.1	79.2	0.60	0.57	0.69	31.9
Approach		818	3.0	0.485	8.5	LOS A	3.1	79.2	0.57	0.52	0.62	32.0
North: Main St												
7	L2	77	3.0	0.374	9.3	LOS A	1.7	44.0	0.63	0.67	0.74	32.4
4	T1	213	3.0	0.374	9.3	LOS A	1.7	44.0	0.63	0.67	0.74	32.4
14	R2	329	3.0	0.203	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		619	3.0	0.374	4.3	LOS A	1.7	44.0	0.29	0.31	0.35	34.7
West: Main St												
5	L2	207	3.0	0.431	10.0	LOS B	2.3	58.7	0.65	0.72	0.85	31.2
2	T1	102	3.0	0.431	10.0	LOS B	2.3	58.7	0.65	0.72	0.85	31.2
12	R2	35	3.0	0.431	10.0	LOS B	2.3	58.7	0.65	0.72	0.85	30.4
Approach		344	3.0	0.431	10.0	LOS B	2.3	58.7	0.65	0.72	0.85	31.1
All Vehicles		1999	3.0	0.485	7.3	LOS A	3.1	79.2	0.49	0.48	0.57	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\11-15 EPAP\3.2 EPAP PM Peak Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	15	96	2	0	0	0	0	84	100	89	97	0
Future Vol, veh/h	15	96	2	0	0	0	0	84	100	89	97	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	109	2	0	0	0	0	95	114	101	110	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9	9.7	9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	24%	0%	100%	0%
Vol Thru, %	46%	76%	96%	0%	100%
Vol Right, %	54%	0%	4%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	184	63	50	89	97
LT Vol	0	15	0	89	0
Through Vol	84	48	48	0	97
RT Vol	100	0	2	0	0
Lane Flow Rate	209	72	57	101	110
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.279	0.113	0.087	0.157	0.155
Departure Headway (Hd)	4.812	5.673	5.525	5.572	5.07
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	746	631	648	644	708
Service Time	2.844	3.415	3.267	3.305	2.803
HCM Lane V/C Ratio	0.28	0.114	0.088	0.157	0.155
HCM Control Delay	9.7	9.1	8.8	9.3	8.7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	1.1	0.4	0.3	0.6	0.5

**Intersection**

Intersection Delay, s/veh 14.9

Intersection LOS B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	189	19	32	178	125	332
Future Vol, veh/h	189	19	32	178	125	332
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	245	25	42	231	162	431
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	14.7	11.7	16.4
HCM LOS	B	B	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	35%	0%
Vol Thru, %	0%	0%	91%	65%	100%
Vol Right, %	0%	100%	9%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	332	208	91	119
LT Vol	125	0	0	32	0
Through Vol	0	0	189	59	119
RT Vol	0	332	19	0	0
Lane Flow Rate	162	431	270	119	154
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.3	0.652	0.468	0.223	0.282
Departure Headway (Hd)	6.661	5.447	6.243	6.764	6.586
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	539	664	575	530	546
Service Time	4.404	3.189	4.287	4.514	4.336
HCM Lane V/C Ratio	0.301	0.649	0.47	0.225	0.282
HCM Control Delay	12.3	17.9	14.7	11.5	11.9
HCM Lane LOS	B	C	B	B	B
HCM 95th-tile Q	1.3	4.8	2.5	0.8	1.2

**Intersection**

Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	440	68	20	154	44	7
Future Vol, veh/h	440	68	20	154	44	7
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	564	87	26	197	56	9
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	11.7	9.2	9.5
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	86%	0%	0%	28%	0%
Vol Thru, %	0%	100%	68%	72%	100%
Vol Right, %	14%	0%	32%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	51	293	215	71	103
LT Vol	44	0	0	20	0
Through Vol	0	293	147	51	103
RT Vol	7	0	68	0	0
Lane Flow Rate	65	376	275	91	132
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.104	0.515	0.36	0.139	0.194
Departure Headway (Hd)	5.743	4.926	4.703	5.458	5.316
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	622	733	765	656	674
Service Time	3.796	2.655	2.433	3.201	3.059
HCM Lane V/C Ratio	0.105	0.513	0.359	0.139	0.196
HCM Control Delay	9.5	12.8	10.1	9.1	9.3
HCM Lane LOS	A	B	B	A	A
HCM 95th-tile Q	0.3	3	1.6	0.5	0.7



Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻	↻	↻	↻		↻	↻	↻
Traffic Vol, veh/h	0	0	110	46	0	55	101	214	10	11	203	3
Future Vol, veh/h	0	0	110	46	0	55	101	214	10	11	203	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	133	55	0	66	122	258	12	13	245	4

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	785	245	848	783	264	249	0	0	270	0	0
Stage 1	-	271	-	508	508	-	-	-	-	-	-	-
Stage 2	-	514	-	340	275	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	325	794	281	325	775	1317	-	-	1293	-	-
Stage 1	0	685	-	547	539	-	-	-	-	-	-	-
Stage 2	0	535	-	675	683	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	292	794	216	292	775	1317	-	-	1293	-	-
Mov Cap-2 Maneuver	-	292	-	216	292	-	-	-	-	-	-	-
Stage 1	-	678	-	496	489	-	-	-	-	-	-	-
Stage 2	-	485	-	557	676	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.4		17.9		2.5		0.4	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1317	-	-	794	216	775	1293	-	-
HCM Lane V/C Ratio	0.092	-	-	0.167	0.257	0.086	0.01	-	-
HCM Control Delay (s)	8	-	-	10.4	27.3	10.1	7.8	-	-
HCM Lane LOS	A	-	-	B	D	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	1	0.3	0	-	-

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Vol, veh/h	13	28	36	311	299	45
Future Vol, veh/h	13	28	36	311	299	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	37	47	409	393	59

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	926	226	452	0	-	0
Stage 1	423	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	283	778	1107	-	-	-
Stage 1	630	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	271	778	1107	-	-	-
Mov Cap-2 Maneuver	469	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	606	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1107	-	469	778	-	-
HCM Lane V/C Ratio	0.043	-	0.036	0.047	-	-
HCM Control Delay (s)	8.4	-	13	9.9	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	10	10	8	29	26	83	16	295	6	30	101	11
Future Vol, veh/h	10	10	8	29	26	83	16	295	6	30	101	11
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	11	9	32	29	92	18	328	7	33	112	12
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	8.7	9.3	12.3	9.1
HCM LOS	A	A	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	36%	21%	100%	0%
Vol Thru, %	0%	98%	36%	19%	0%	90%
Vol Right, %	0%	2%	29%	60%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	16	301	28	138	30	112
LT Vol	16	0	10	29	30	0
Through Vol	0	295	10	26	0	101
RT Vol	0	6	8	83	0	11
Lane Flow Rate	18	334	31	153	33	124
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.028	0.477	0.046	0.21	0.054	0.182
Departure Headway (Hd)	5.652	5.135	5.326	4.92	5.837	5.263
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	631	699	667	725	610	677
Service Time	3.411	2.894	3.404	2.975	3.606	3.032
HCM Lane V/C Ratio	0.029	0.478	0.046	0.211	0.054	0.183
HCM Control Delay	8.6	12.5	8.7	9.3	8.9	9.2
HCM Lane LOS	A	B	A	A	A	A
HCM 95th-tile Q	0.1	2.6	0.1	0.8	0.2	0.7

Intersection						
Int Delay, s/veh	5.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	46	123	127	229	117	43
Future Vol, veh/h	46	123	127	229	117	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	154	159	286	146	54

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	159	0	-	0	429
Stage 1	-	-	-	-	159
Stage 2	-	-	-	-	270
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1420	-	-	0	583
Stage 1	-	-	-	0	870
Stage 2	-	-	-	0	775
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1420	-	-	-	559
Mov Cap-2 Maneuver	-	-	-	-	559
Stage 1	-	-	-	-	834
Stage 2	-	-	-	-	775

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1420	-	-	559	886
HCM Lane V/C Ratio	0.04	-	-	0.262	0.061
HCM Control Delay (s)	7.6	-	-	13.7	9.3
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1	0.2

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	317	138	0
Future Vol, veh/h	0	0	0	317	138	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	360	157	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	517	157	157	0	0
Stage 1	157	-	-	-	-
Stage 2	360	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	518	889	1423	-	-
Stage 1	871	-	-	-	-
Stage 2	706	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	518	889	1423	-	-
Mov Cap-2 Maneuver	642	-	-	-	-
Stage 1	871	-	-	-	-
Stage 2	706	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1423	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	28	0	0	53	0	0
Future Vol, veh/h	28	0	0	53	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	0	0	58	0	0

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	30	0	88
Stage 1	-	-	-	-	30
Stage 2	-	-	-	-	58
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1583	-	913
Stage 1	-	-	-	-	993
Stage 2	-	-	-	-	965
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1583	-	913
Mov Cap-2 Maneuver	-	-	-	-	913
Stage 1	-	-	-	-	993
Stage 2	-	-	-	-	965

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1583	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	176	0	0	66	0	0	0	0	0	0	0
Future Vol, veh/h	0	176	0	0	66	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	71	71	71	71	71	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	248	0	0	93	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	93	0	0	248	0	0	341	341	248	341	341	93
Stage 1	-	-	-	-	-	-	248	248	-	93	93	-
Stage 2	-	-	-	-	-	-	93	93	-	248	248	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1501	-	-	1318	-	-	613	581	791	613	581	964
Stage 1	-	-	-	-	-	-	756	701	-	914	818	-
Stage 2	-	-	-	-	-	-	914	818	-	756	701	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1501	-	-	1318	-	-	613	581	791	613	581	964
Mov Cap-2 Maneuver	-	-	-	-	-	-	613	581	-	613	581	-
Stage 1	-	-	-	-	-	-	756	701	-	914	818	-
Stage 2	-	-	-	-	-	-	914	818	-	756	701	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			0			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1501	-	-	1318	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	146	173	10	124	39	6
Future Vol, veh/h	146	173	10	124	39	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	195	231	13	165	52	8

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	426	0	386
Stage 1	-	-	-	-	195
Stage 2	-	-	-	-	191
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1133	-	617
Stage 1	-	-	-	-	838
Stage 2	-	-	-	-	841
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1133	-	610
Mov Cap-2 Maneuver	-	-	-	-	610
Stage 1	-	-	-	-	838
Stage 2	-	-	-	-	832

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	634	-	-	1133	-
HCM Lane V/C Ratio	0.095	-	-	0.012	-
HCM Control Delay (s)	11.3	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-



Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	↕
Traffic Vol, veh/h	48	89	68	42	22	59
Future Vol, veh/h	48	89	68	42	22	59
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	105	80	49	26	69
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.4	7.8	7.9
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	35%	0%	100%	0%
Vol Thru, %	65%	62%	0%	0%
Vol Right, %	0%	38%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	110	22	59
LT Vol	48	0	22	0
Through Vol	89	68	0	0
RT Vol	0	42	0	59
Lane Flow Rate	161	129	26	69
Geometry Grp	2	2	7	7
Degree of Util (X)	0.196	0.148	0.041	0.086
Departure Headway (Hd)	4.376	4.107	5.675	4.469
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	825	876	633	804
Service Time	2.376	2.119	3.392	2.186
HCM Lane V/C Ratio	0.195	0.147	0.041	0.086
HCM Control Delay	8.4	7.8	8.6	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.5	0.1	0.3

**Intersection**

Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	44	86	38	43	46
Future Vol, veh/h	32	44	86	38	43	46
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	56	110	49	55	59
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.9	8.6	7.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	69%	42%	0%	0%
Vol Thru, %	31%	0%	100%	0%
Vol Right, %	0%	58%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	124	76	43	46
LT Vol	86	32	0	0
Through Vol	38	0	43	0
RT Vol	0	44	0	46
Lane Flow Rate	159	97	55	59
Geometry Grp	5	2	7	7
Degree of Util (X)	0.196	0.116	0.073	0.067
Departure Headway (Hd)	4.431	4.292	4.791	4.089
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	798	840	738	862
Service Time	2.522	2.292	2.586	1.883
HCM Lane V/C Ratio	0.199	0.115	0.075	0.068
HCM Control Delay	8.6	7.9	8	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.4	0.2	0.2

Queues

24: Brunswick Rd & Loma Rica Dr















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	30	87	302	130	230	134
v/c Ratio	0.09	0.13	0.46	0.20	0.42	0.10
Control Delay	21.8	2.9	15.7	4.5	17.3	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	2.9	15.7	4.5	17.3	2.3
Queue Length 50th (ft)	4	0	37	0	30	0
Queue Length 95th (ft)	32	19	161	31	133	26
Internal Link Dist (ft)	1029		820			723
Turn Bay Length (ft)	165			410	405	
Base Capacity (vph)	778	1078	1436	1247	1027	1755
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.08	0.21	0.10	0.22	0.08

Intersection Summary

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP 0630  
 01/11/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	28	80	278	120	212	123
Future Volume (veh/h)	28	80	278	120	212	123
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	30	87	302	130	230	134
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	171	425	478	405	307	1074
Arrive On Green	0.10	0.10	0.26	0.26	0.18	0.59
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	30	87	302	130	230	134
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.5	1.5	5.0	2.3	4.3	1.1
Cycle Q Clear(g_c), s	0.5	1.5	5.0	2.3	4.3	1.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	171	425	478	405	307	1074
V/C Ratio(X)	0.18	0.20	0.63	0.32	0.75	0.12
Avail Cap(c_a), veh/h	719	913	1617	1370	1015	2634
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.1	9.5	11.1	10.1	13.3	3.1
Incr Delay (d2), s/veh	0.5	0.2	1.4	0.5	3.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	1.4	0.5	1.4	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.6	9.7	12.5	10.6	17.0	3.2
LnGrp LOS	B	A	B	B	B	A
Approach Vol, veh/h	117		432			364
Approach Delay, s/veh	11.0		11.9			11.9
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.1	14.7			25.9	8.2
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.3	7.0			3.1	3.5
Green Ext Time (p_c), s	0.5	2.0			0.7	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.8			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	2.6	9.0	4.5	4.8

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.6	0.0	0.6
Total Del/Veh (s)	4.4	6.0	8.7	6.3

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	5.4	7.7	0.5	3.8

8: Main St & Maltman Dr/Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.3	2.1	1.0
Total Del/Veh (s)	14.2	4.6	7.8	6.8	6.1

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.7	2.9	0.9
Total Del/Veh (s)	3.8	8.8	20.5	36.6	15.9

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.5	4.0	20.7	9.1

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	1.4	0.0	0.2
Total Del/Veh (s)	5.5	9.1	11.2	1.2	5.2

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	1.6	0.9
Total Del/Veh (s)	11.6	11.0	7.4	9.3

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.8	0.0	0.1	0.5
Total Del/Veh (s)	6.7	5.7	7.6	6.2

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Total Zone Performance

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Denied Del/Veh (s)	1.1
Total Del/Veh (s)	70.1

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	86	114	67	57
Average Queue (ft)	29	44	25	16
95th Queue (ft)	67	86	59	43
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	97	67	107	100	87
Average Queue (ft)	43	25	35	45	29
95th Queue (ft)	78	55	78	84	64
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	66	56	31	56	4
Average Queue (ft)	35	26	7	30	0
95th Queue (ft)	57	50	27	46	3
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					



Intersection: 8: Main St & Maltman Dr/Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB	
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR	
Maximum Queue (ft)	36	47	63	74	25	68	50	45	79	50	
Average Queue (ft)	7	17	19	25	2	26	16	6	32	13	
95th Queue (ft)	27	39	45	54	11	58	43	28	60	39	
Link Distance (ft)	777	160	160	160		1486				1622	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)					115			115	360	360	
Storage Blk Time (%)	0										
Queuing Penalty (veh)	0										

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB	
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R	
Maximum Queue (ft)	50	66	67	57	95	36	34	106	128	53	52	
Average Queue (ft)	8	17	27	11	25	5	10	29	69	12	22	
95th Queue (ft)	31	47	62	40	71	22	32	76	117	38	47	
Link Distance (ft)	160	160		103	103		1666			1351		
Upstream Blk Time (%)	0											
Queuing Penalty (veh)	0											
Storage Bay Dist (ft)			140				100	240	240			
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	61	26	24	38	190	116	19
Average Queue (ft)	6	4	1	2	95	57	1
95th Queue (ft)	29	18	11	17	165	93	11
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)						3	0
Queuing Penalty (veh)						0	0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	46	69	74	86	54	58	76	98	32	70	36	48
Average Queue (ft)	13	31	19	37	19	17	31	45	4	28	13	16
95th Queue (ft)	39	59	53	74	45	44	66	86	21	56	32	43
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	36
Average Queue (ft)	6
95th Queue (ft)	26
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	74	106	50	64	71	66	140	51
Average Queue (ft)	28	38	14	24	28	22	62	20
95th Queue (ft)	60	79	39	49	56	55	112	41
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	109	42	109	89	99	64	61
Average Queue (ft)	33	16	42	32	23	24	27
95th Queue (ft)	75	36	81	71	70	53	50
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Zone Summary

Zone wide Queuing Penalty: 1
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# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP 0630-0730 AM  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	16	3.0	0.088	4.6	LOS A	0.4	9.2	0.45	0.33	0.45	34.9
8	T1	22	3.0	0.088	4.6	LOS A	0.4	9.2	0.45	0.33	0.45	34.8
18	R2	45	3.0	0.088	4.6	LOS A	0.4	9.2	0.45	0.33	0.45	33.8
Approach		83	3.0	0.088	4.6	LOS A	0.4	9.2	0.45	0.33	0.45	34.3
East: Idaho Maryland Rd												
1	L2	121	3.0	0.104	4.0	LOS A	0.4	10.7	0.31	0.19	0.31	33.0
6	T1	56	3.0	0.150	4.4	LOS A	0.6	16.1	0.33	0.20	0.33	35.4
16	R2	118	3.0	0.150	4.4	LOS A	0.6	16.1	0.33	0.20	0.33	34.3
Approach		295	3.0	0.150	4.2	LOS A	0.6	16.1	0.32	0.20	0.32	33.9
North: Main St												
7	L2	70	3.0	0.191	4.8	LOS A	0.8	20.0	0.32	0.21	0.32	34.5
4	T1	153	3.0	0.191	4.8	LOS A	0.8	20.0	0.32	0.21	0.32	34.4
14	R2	77	3.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		300	3.0	0.191	3.6	LOS A	0.8	20.0	0.24	0.16	0.24	35.1
West: Main St												
5	L2	148	3.0	0.278	6.3	LOS A	1.2	30.1	0.46	0.38	0.46	33.1
2	T1	112	3.0	0.278	6.3	LOS A	1.2	30.1	0.46	0.38	0.46	33.1
12	R2	23	3.0	0.278	6.3	LOS A	1.2	30.1	0.46	0.38	0.46	32.2
Approach		283	3.0	0.278	6.3	LOS A	1.2	30.1	0.46	0.38	0.46	33.0
All Vehicles		961	3.0	0.278	4.7	LOS A	1.2	30.1	0.35	0.25	0.35	34.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\11-15 EPAP\3.3 EPAP 0630 AM Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	47	329	3	0	0	0	0	95	155	164	304	0
Future Vol, veh/h	47	329	3	0	0	0	0	95	155	164	304	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	52	366	3	0	0	0	0	106	172	182	338	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.1	14.8	16.2
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	22%	0%	100%	0%
Vol Thru, %	38%	78%	98%	0%	100%
Vol Right, %	62%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	250	212	168	164	304
LT Vol	0	47	0	164	0
Through Vol	95	165	165	0	304
RT Vol	155	0	3	0	0
Lane Flow Rate	278	235	186	182	338
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.477	0.445	0.346	0.344	0.591
Departure Headway (Hd)	6.181	6.817	6.692	6.804	6.295
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	581	526	536	528	571
Service Time	4.232	4.572	4.446	4.555	4.047
HCM Lane V/C Ratio	0.478	0.447	0.347	0.345	0.592
HCM Control Delay	14.8	15	13	13.1	17.8
HCM Lane LOS	B	B	B	B	C
HCM 95th-tile Q	2.6	2.3	1.5	1.5	3.8

Intersection	
Intersection Delay, s/veh	22.6
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	288	61	57	626	203	224
Future Vol, veh/h	288	61	57	626	203	224
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	306	65	61	666	216	238
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	22.6	26.8	15.9
HCM LOS	C	D	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	21%	0%
Vol Thru, %	0%	0%	83%	79%	100%
Vol Right, %	0%	100%	17%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	203	224	349	266	417
LT Vol	203	0	0	57	0
Through Vol	0	0	288	209	417
RT Vol	0	224	61	0	0
Lane Flow Rate	216	238	371	283	444
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.47	0.438	0.68	0.53	0.819
Departure Headway (Hd)	7.843	6.616	6.597	6.755	6.645
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	458	541	546	531	542
Service Time	5.613	4.385	4.662	4.527	4.417
HCM Lane V/C Ratio	0.472	0.44	0.679	0.533	0.819
HCM Control Delay	17.4	14.5	22.6	17	33
HCM Lane LOS	C	B	C	C	D
HCM 95th-tile Q	2.5	2.2	5.1	3.1	8.1

**Intersection**

Intersection Delay, s/veh 16.5

Intersection LOS C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	390	88	31	530	107	49
Future Vol, veh/h	390	88	31	530	107	49
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	480	108	38	652	132	60
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.6	19.2	12.9
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	69%	0%	0%	15%	0%
Vol Thru, %	0%	100%	60%	85%	100%
Vol Right, %	31%	0%	40%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	260	218	208	353
LT Vol	107	0	0	31	0
Through Vol	0	260	130	177	353
RT Vol	49	0	88	0	0
Lane Flow Rate	192	320	268	256	435
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.346	0.542	0.433	0.429	0.72
Departure Headway (Hd)	6.48	6.101	5.814	6.038	5.963
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	555	589	617	596	604
Service Time	4.523	3.848	3.561	3.782	3.706
HCM Lane V/C Ratio	0.346	0.543	0.434	0.43	0.72
HCM Control Delay	12.9	15.9	13	13.3	22.6
HCM Lane LOS	B	C	B	B	C
HCM 95th-tile Q	1.5	3.2	2.2	2.1	6

Intersection												
Int Delay, s/veh	7.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	0	0	200	27	0	49	190	458	50	86	424	13
Future Vol, veh/h	0	0	200	27	0	49	190	458	50	86	424	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	213	29	0	52	202	487	53	91	451	14

Major/Minor	Minor2		Minor1			Major1		Major2				
Conflicting Flow All	-	1577	451	1665	1565	514	465	0	0	540	0	0
Stage 1	-	633	-	918	918	-	-	-	-	-	-	-
Stage 2	-	944	-	747	647	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	110	608	77	111	560	1096	-	-	1028	-	-
Stage 1	0	473	-	326	350	-	-	-	-	-	-	-
Stage 2	0	341	-	405	467	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	82	608	40	82	560	1096	-	-	1028	-	-
Mov Cap-2 Maneuver	-	82	-	40	82	-	-	-	-	-	-	-
Stage 1	-	431	-	266	286	-	-	-	-	-	-	-
Stage 2	-	278	-	240	425	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.1		83.7		2.5		1.5	
HCM LOS	B		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1096	-	-	608	40	560	1028	-	-
HCM Lane V/C Ratio	0.184	-	-	0.35	0.718	0.093	0.089	-	-
HCM Control Delay (s)	9	-	-	14.1	213.5	12.1	8.8	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	1.6	2.7	0.3	0.3	-	-



Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↗	↗	↗
Traffic Vol, veh/h	64	71	41	637	608	34
Future Vol, veh/h	64	71	41	637	608	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	73	42	657	627	35

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1386	331	662	0	-	0
Stage 1	645	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	145	666	925	-	-	-
Stage 1	485	-	-	-	-	-
Stage 2	470	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	138	666	925	-	-	-
Mov Cap-2 Maneuver	339	-	-	-	-	-
Stage 1	463	-	-	-	-	-
Stage 2	470	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.5	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	925	-	339	666	-	-
HCM Lane V/C Ratio	0.046	-	0.195	0.11	-	-
HCM Control Delay (s)	9.1	-	18.2	11.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	0.4	-	-

Intersection	
Intersection Delay, s/veh	18.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	23	33	10	17	25	85	7	331	24	127	430	26
Future Vol, veh/h	23	33	10	17	25	85	7	331	24	127	430	26
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	35	11	18	27	90	7	352	26	135	457	28
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	10.9	11.2	17.9	21.4
HCM LOS	B	B	C	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	35%	13%	100%	0%
Vol Thru, %	0%	93%	50%	20%	0%	94%
Vol Right, %	0%	7%	15%	67%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	355	66	127	127	456
LT Vol	7	0	23	17	127	0
Through Vol	0	331	33	25	0	430
RT Vol	0	24	10	85	0	26
Lane Flow Rate	7	378	70	135	135	485
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.013	0.624	0.132	0.233	0.233	0.763
Departure Headway (Hd)	6.503	5.948	6.749	6.197	6.211	5.664
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	549	604	528	577	577	635
Service Time	4.256	3.701	4.828	4.265	3.957	3.41
HCM Lane V/C Ratio	0.013	0.626	0.133	0.234	0.234	0.764
HCM Control Delay	9.3	18.1	10.9	11.2	10.8	24.4
HCM Lane LOS	A	C	B	B	B	C
HCM 95th-tile Q	0	4.3	0.5	0.9	0.9	7

Intersection						
Int Delay, s/veh	18.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	80	205	186	276	331	105
Future Vol, veh/h	80	205	186	276	331	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	225	204	303	364	115

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	204	0	-	0	605 204
Stage 1	-	-	-	-	204 -
Stage 2	-	-	-	-	401 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1368	-	-	0	461 837
Stage 1	-	-	-	0	830 -
Stage 2	-	-	-	0	676 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1368	-	-	-	431 837
Mov Cap-2 Maneuver	-	-	-	-	431 -
Stage 1	-	-	-	-	777 -
Stage 2	-	-	-	-	676 -

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	36.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1368	-	-	431	837
HCM Lane V/C Ratio	0.064	-	-	0.844	0.138
HCM Control Delay (s)	7.8	-	-	44.6	10
HCM Lane LOS	A	-	-	E	B
HCM 95th %tile Q(veh)	0.2	-	-	8.2	0.5

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	WT		W	↑	↑	
Traffic Vol, veh/h	0	0	0	362	457	0
Future Vol, veh/h	0	0	0	362	457	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	381	481	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	862	481	481	0	0
Stage 1	481	-	-	-	-
Stage 2	381	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	325	585	1082	-	-
Stage 1	622	-	-	-	-
Stage 2	691	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	325	585	1082	-	-
Mov Cap-2 Maneuver	515	-	-	-	-
Stage 1	622	-	-	-	-
Stage 2	691	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1082	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	66	0	0	58	0	0
Future Vol, veh/h	66	0	0	58	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	0	0	63	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	72	0	135 72
Stage 1	-	-	-	-	72 -
Stage 2	-	-	-	-	63 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1528	-	859 990
Stage 1	-	-	-	-	951 -
Stage 2	-	-	-	-	960 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1528	-	859 990
Mov Cap-2 Maneuver	-	-	-	-	859 -
Stage 1	-	-	-	-	951 -
Stage 2	-	-	-	-	960 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1528	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	104	0	0	174	0	0	0	0	0	0	0
Future Vol, veh/h	5	104	0	0	174	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	137	0	0	229	0	0	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	229	0	0	137	0	0	406	406	137	406	406	229
Stage 1	-	-	-	-	-	-	177	177	-	229	229	-
Stage 2	-	-	-	-	-	-	229	229	-	177	177	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1339	-	-	1447	-	-	555	534	911	555	534	810
Stage 1	-	-	-	-	-	-	825	753	-	774	715	-
Stage 2	-	-	-	-	-	-	774	715	-	825	753	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1339	-	-	1447	-	-	548	525	911	548	525	810
Mov Cap-2 Maneuver	-	-	-	-	-	-	548	525	-	548	525	-
Stage 1	-	-	-	-	-	-	812	741	-	762	715	-
Stage 2	-	-	-	-	-	-	774	715	-	812	741	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			0			0			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1339	-	-	1447	-	-	-
HCM Lane V/C Ratio	-	0.015	-	-	-	-	-	-
HCM Control Delay (s)	0	7.7	0	-	0	-	-	0
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	25.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	299	120	12	385	245	37
Future Vol, veh/h	299	120	12	385	245	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	374	150	15	481	306	46

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	524	0	885 374
Stage 1	-	-	-	-	374 -
Stage 2	-	-	-	-	511 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1043	-	315 672
Stage 1	-	-	-	-	696 -
Stage 2	-	-	-	-	602 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1043	-	311 672
Mov Cap-2 Maneuver	-	-	-	-	311 -
Stage 1	-	-	-	-	696 -
Stage 2	-	-	-	-	594 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	99.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	335	-	-	1043	-
HCM Lane V/C Ratio	1.052	-	-	0.014	-
HCM Control Delay (s)	99.8	-	-	8.5	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	12.6	-	-	0	-

Intersection	
Intersection Delay, s/veh	13.9
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	↕
Traffic Vol, veh/h	212	115	199	67	107	208
Future Vol, veh/h	212	115	199	67	107	208
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	249	135	234	79	126	245
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	16.5	13.2	11.9
HCM LOS	C	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	65%	0%	100%	0%
Vol Thru, %	35%	75%	0%	0%
Vol Right, %	0%	25%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	327	266	107	208
LT Vol	212	0	107	0
Through Vol	115	199	0	0
RT Vol	0	67	0	208
Lane Flow Rate	385	313	126	245
Geometry Grp	2	2	7	7
Degree of Util (X)	0.595	0.471	0.241	0.386
Departure Headway (Hd)	5.572	5.418	6.898	5.679
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	646	663	520	634
Service Time	3.612	3.46	4.643	3.423
HCM Lane V/C Ratio	0.596	0.472	0.242	0.386
HCM Control Delay	16.5	13.2	11.8	12
HCM Lane LOS	C	B	B	B
HCM 95th-tile Q	3.9	2.5	0.9	1.8



**Intersection**

Intersection Delay, s/veh 15.6  
Intersection LOS C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	144	186	125	172	179	179
Future Vol, veh/h	144	186	125	172	179	179
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	224	151	207	216	216
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	17.9	17.4	12.1
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	42%	44%	0%	0%
Vol Thru, %	58%	0%	100%	0%
Vol Right, %	0%	56%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	297	330	179	179
LT Vol	125	144	0	0
Through Vol	172	0	179	0
RT Vol	0	186	0	179
Lane Flow Rate	358	398	216	216
Geometry Grp	5	2	7	7
Degree of Util (X)	0.592	0.627	0.377	0.335
Departure Headway (Hd)	5.951	5.673	6.301	5.588
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	632	569	641
Service Time	4.012	3.731	4.067	3.354
HCM Lane V/C Ratio	0.592	0.63	0.38	0.337
HCM Control Delay	17.4	17.9	12.9	11.2
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	3.9	4.4	1.7	1.5

## Queues

EPAP 1530

## 24: Brunswick Rd &amp; Loma Rica Dr

01/11/2021



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	192	342	414	82	180	459
v/c Ratio	0.58	0.39	0.71	0.15	0.52	0.41
Control Delay	32.8	4.5	25.8	5.0	29.0	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.8	4.5	25.8	5.0	29.0	6.9
Queue Length 50th (ft)	61	14	125	0	57	72
Queue Length 95th (ft)	#160	67	253	26	135	125
Internal Link Dist (ft)	1010		910			683
Turn Bay Length (ft)	165			410	405	
Base Capacity (vph)	430	1070	971	863	607	1610
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.32	0.43	0.10	0.30	0.29













## Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP 1530  
 01/11/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	177	315	381	75	166	422
Future Volume (veh/h)	177	315	381	75	166	422
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	192	342	414	82	180	459
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	409	574	544	461	236	987
Arrive On Green	0.24	0.24	0.30	0.30	0.14	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	192	342	414	82	180	459
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	4.5	8.5	9.8	1.9	4.8	7.4
Cycle Q Clear(g_c), s	4.5	8.5	9.8	1.9	4.8	7.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	409	574	544	461	236	987
V/C Ratio(X)	0.47	0.60	0.76	0.18	0.76	0.47
Avail Cap(c_a), veh/h	514	667	1156	980	725	1883
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.7	12.1	15.2	12.4	19.9	6.7
Incr Delay (d2), s/veh	0.8	1.1	2.2	0.2	5.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	2.6	3.4	0.5	1.9	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.5	13.2	17.4	12.6	25.0	7.1
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	534		496			639
Approach Delay, s/veh	14.4		16.6			12.1
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.6	20.0			31.6	16.1
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.8	11.8			9.4	10.5
Green Ext Time (p_c), s	0.4	2.4			2.8	0.7
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.2			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	8.0	14.9	5.1	8.4

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	1.0	0.0	0.5
Total Del/Veh (s)	5.6	8.3	12.5	8.7

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.4	0.2
Total Del/Veh (s)	10.0	9.2	1.6	6.4

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.1
Total Del/Veh (s)	19.2	9.7	16.7	16.0	13.7

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.7
Total Del/Veh (s)	14.0	14.5	19.0	36.3	19.8

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.6	9.4	26.4	13.5

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.4
Total Del/Veh (s)	16.5	31.8	26.7	11.1	21.5

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	2.7	0.9
Total Del/Veh (s)	13.5	14.2	13.4	13.7

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.3	0.0	0.2	1.1
Total Del/Veh (s)	17.6	11.5	15.4	14.9

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Total Zone Performance

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Denied Del/Veh (s)	1.3
Total Del/Veh (s)	674.2

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	105	176	97	99
Average Queue (ft)	62	79	44	40
95th Queue (ft)	105	139	78	77
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	3			
Queuing Penalty (veh)	8			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	127	115	150	115	104
Average Queue (ft)	68	34	65	61	51
95th Queue (ft)	109	76	115	99	89
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			1	0
Queuing Penalty (veh)	0			2	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	1		
Queuing Penalty (veh)		0	2		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	139	122	39	62	31
Average Queue (ft)	74	56	15	35	3
95th Queue (ft)	119	98	41	54	18
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	47	115	106	165	15	199	139	191	209	146
Average Queue (ft)	13	48	50	82	1	89	63	65	109	59
95th Queue (ft)	39	90	90	153	10	157	119	143	179	118
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0		1						
Queuing Penalty (veh)		0		1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						4	0			
Queuing Penalty (veh)						7	1			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	171	194	102	180	178	97	165	181	210	82	120
Average Queue (ft)	95	131	68	72	96	30	77	99	132	26	46
95th Queue (ft)	177	210	107	157	174	75	135	175	191	61	86
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	6	2	4	7						
Queuing Penalty (veh)	3	21	0	17	24						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	4		0	4		0		
Queuing Penalty (veh)			6	6		0	1		0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	172	173	198	239	89	216	228	384
Average Queue (ft)	57	61	54	76	3	145	159	79
95th Queue (ft)	123	133	144	185	54	225	245	296
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	13	19	
Queuing Penalty (veh)				0	0	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								



Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	133	140	184	184	188	178	244	312	211	279	224	124
Average Queue (ft)	61	78	96	106	88	80	108	182	84	161	82	56
95th Queue (ft)	112	124	157	167	150	144	188	274	182	241	164	102
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)			0	0	0	2	5		0	0	0	
Queuing Penalty (veh)			0	0	0	6	6		0	1	0	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	112
Average Queue (ft)	46
95th Queue (ft)	88
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	190	209	129	112	161	100	129	118
Average Queue (ft)	86	98	58	50	72	43	57	54
95th Queue (ft)	155	187	110	97	134	82	104	98
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	0	1						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			0	0				
Queuing Penalty (veh)			0	0				

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	440	180	216	124	122	181	69
Average Queue (ft)	171	103	109	40	37	92	34
95th Queue (ft)	336	199	184	95	92	154	58
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)	0		1				
Queuing Penalty (veh)	0		1				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	8	1					
Queuing Penalty (veh)	30	5					

Zone Summary

Zone wide Queuing Penalty: 149

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP 1530-1630 PM  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	59	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.7
8	T1	54	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.6
18	R2	86	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	32.7
Approach		200	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.2
East: Idaho Maryland Rd												
1	L2	327	3.0	0.316	6.7	LOS A	1.5	38.0	0.48	0.39	0.48	31.8
6	T1	209	3.0	0.402	7.8	LOS A	2.1	52.6	0.52	0.43	0.52	33.7
16	R2	208	3.0	0.402	7.8	LOS A	2.1	52.6	0.52	0.43	0.52	32.6
Approach		745	3.0	0.402	7.3	LOS A	2.1	52.6	0.51	0.41	0.51	32.5
North: Main St												
7	L2	92	3.0	0.393	9.2	LOS A	1.9	48.9	0.62	0.66	0.74	32.4
4	T1	230	3.0	0.393	9.2	LOS A	1.9	48.9	0.62	0.66	0.74	32.4
14	R2	310	3.0	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		632	3.0	0.393	4.7	LOS A	1.9	48.9	0.32	0.34	0.38	34.5
West: Main St												
5	L2	194	3.0	0.431	10.2	LOS B	2.3	58.2	0.65	0.72	0.86	31.2
2	T1	102	3.0	0.431	10.2	LOS B	2.3	58.2	0.65	0.72	0.86	31.2
12	R2	41	3.0	0.431	10.2	LOS B	2.3	58.2	0.65	0.72	0.86	30.4
Approach		336	3.0	0.431	10.2	LOS B	2.3	58.2	0.65	0.72	0.86	31.1
All Vehicles		1914	3.0	0.431	6.8	LOS A	2.3	58.2	0.47	0.45	0.53	33.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\11-15 EPAP\3.4 EPAP 1530 PM Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	28	181	3	0	0	0	0	60	62	115	198	0
Future Vol, veh/h	28	181	3	0	0	0	0	60	62	115	198	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	201	3	0	0	0	0	67	69	128	220	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9.9	9.7	10.5
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	24%	0%	100%	0%
Vol Thru, %	49%	76%	97%	0%	100%
Vol Right, %	51%	0%	3%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	122	119	94	115	198
LT Vol	0	28	0	115	0
Through Vol	60	91	91	0	198
RT Vol	62	0	3	0	0
Lane Flow Rate	136	132	104	128	220
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.199	0.214	0.165	0.207	0.326
Departure Headway (Hd)	5.291	5.854	5.713	5.831	5.328
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	674	610	624	613	671
Service Time	3.362	3.626	3.485	3.593	3.089
HCM Lane V/C Ratio	0.202	0.216	0.167	0.209	0.328
HCM Control Delay	9.7	10.2	9.6	10.1	10.7
HCM Lane LOS	A	B	A	B	B
HCM 95th-tile Q	0.7	0.8	0.6	0.8	1.4

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	106	35	21	266	82	101
Future Vol, veh/h	106	35	21	266	82	101
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	42	25	320	99	122
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	9.9	10.1	9.6
HCM LOS	A	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	19%	0%
Vol Thru, %	0%	0%	75%	81%	100%
Vol Right, %	0%	100%	25%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	82	101	141	110	177
LT Vol	82	0	0	21	0
Through Vol	0	0	106	89	177
RT Vol	0	101	35	0	0
Lane Flow Rate	99	122	170	132	214
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.172	0.171	0.244	0.198	0.314
Departure Headway (Hd)	6.282	5.072	5.173	5.394	5.298
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	568	702	690	662	675
Service Time	4.053	2.842	3.237	3.152	3.056
HCM Lane V/C Ratio	0.174	0.174	0.246	0.199	0.317
HCM Control Delay	10.4	8.9	9.9	9.5	10.5
HCM Lane LOS	B	A	A	A	B
HCM 95th-tile Q	0.6	0.6	1	0.7	1.3

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	195	8	2	243	27	12
Future Vol, veh/h	195	8	2	243	27	12
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	228	9	2	284	32	14
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	8.6	8.9	8.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	69%	0%	0%	2%	0%
Vol Thru, %	0%	100%	89%	98%	100%
Vol Right, %	31%	0%	11%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	130	73	83	162
LT Vol	27	0	0	2	0
Through Vol	0	130	65	81	162
RT Vol	12	0	8	0	0
Lane Flow Rate	46	152	85	97	190
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.064	0.207	0.114	0.131	0.255
Departure Headway (Hd)	5.039	4.887	4.81	4.856	4.844
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	712	737	748	740	743
Service Time	3.063	2.601	2.524	2.571	2.558
HCM Lane V/C Ratio	0.065	0.206	0.114	0.131	0.256
HCM Control Delay	8.4	8.9	8.1	8.3	9.2
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.8	0.4	0.4	1

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	0	0	108	22	0	36	70	188	26	63	259	1
Future Vol, veh/h	0	0	108	22	0	36	70	188	26	63	259	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	120	24	0	40	78	209	29	70	288	1

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	822	288	869	809	224	289	0	0	238	0	0
Stage 1	-	428	-	380	380	-	-	-	-	-	-	-
Stage 2	-	394	-	489	429	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	309	751	272	314	815	1273	-	-	1329	-	-
Stage 1	0	585	-	642	614	-	-	-	-	-	-	-
Stage 2	0	605	-	561	584	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	275	751	209	279	815	1273	-	-	1329	-	-
Mov Cap-2 Maneuver	-	275	-	209	279	-	-	-	-	-	-	-
Stage 1	-	554	-	603	577	-	-	-	-	-	-	-
Stage 2	-	568	-	447	553	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.7		15.3		2		1.5	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1273	-	-	751	209	815	1329	-	-
HCM Lane V/C Ratio	0.061	-	-	0.16	0.117	0.049	0.053	-	-
HCM Control Delay (s)	8	-	-	10.7	24.5	9.6	7.9	-	-
HCM Lane LOS	A	-	-	B	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.6	0.4	0.2	0.2	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	15	33	8	265	384	13
Future Vol, veh/h	15	33	8	265	384	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	38	9	308	447	15

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	781	231	462	0	-	0
Stage 1	455	-	-	-	-	-
Stage 2	326	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	347	772	1097	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	344	772	1097	-	-	-
Mov Cap-2 Maneuver	520	-	-	-	-	-
Stage 1	602	-	-	-	-	-
Stage 2	731	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1097	-	520	772	-	-
HCM Lane V/C Ratio	0.008	-	0.034	0.05	-	-
HCM Control Delay (s)	8.3	-	12.2	9.9	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.2	-	-



Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	12	26	2	11	17	43	3	174	12	89	272	17
Future Vol, veh/h	12	26	2	11	17	43	3	174	12	89	272	17
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	30	2	13	20	49	3	200	14	102	313	20
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.1	8.9	10.4	11.5
HCM LOS	A	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	30%	15%	100%	0%
Vol Thru, %	0%	94%	65%	24%	0%	94%
Vol Right, %	0%	6%	5%	61%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	186	40	71	89	289
LT Vol	3	0	12	11	89	0
Through Vol	0	174	26	17	0	272
RT Vol	0	12	2	43	0	17
Lane Flow Rate	3	214	46	82	102	332
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.006	0.311	0.071	0.117	0.158	0.464
Departure Headway (Hd)	5.79	5.241	5.597	5.175	5.568	5.024
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	616	682	635	688	642	714
Service Time	3.546	2.996	3.673	3.242	3.317	2.772
HCM Lane V/C Ratio	0.005	0.314	0.072	0.119	0.159	0.465
HCM Control Delay	8.6	10.4	9.1	8.9	9.4	12.1
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0	1.3	0.2	0.4	0.6	2.5

Intersection						
Int Delay, s/veh	7.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	23	134	79	160	228	43
Future Vol, veh/h	23	134	79	160	228	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	151	89	180	256	48

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	89	0	-	0	292 89
Stage 1	-	-	-	-	89 -
Stage 2	-	-	-	-	203 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1506	-	-	0	699 969
Stage 1	-	-	-	0	934 -
Stage 2	-	-	-	0	831 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1506	-	-	-	687 969
Mov Cap-2 Maneuver	-	-	-	-	687 -
Stage 1	-	-	-	-	918 -
Stage 2	-	-	-	-	831 -

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1506	-	-	687	969
HCM Lane V/C Ratio	0.017	-	-	0.373	0.05
HCM Control Delay (s)	7.4	-	-	13.3	8.9
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.7	0.2

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	189	285	0
Future Vol, veh/h	0	0	0	189	285	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	220	331	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	551	331	331	0	0
Stage 1	331	-	-	-	-
Stage 2	220	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	495	711	1228	-	-
Stage 1	728	-	-	-	-
Stage 2	817	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	495	711	1228	-	-
Mov Cap-2 Maneuver	639	-	-	-	-
Stage 1	728	-	-	-	-
Stage 2	817	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1228	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	40	0	0	37	0	0
Future Vol, veh/h	40	0	0	37	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	0	0	40	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	43	0	83
Stage 1	-	-	-	-	43
Stage 2	-	-	-	-	40
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1566	-	919
Stage 1	-	-	-	-	979
Stage 2	-	-	-	-	982
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1566	-	919
Mov Cap-2 Maneuver	-	-	-	-	919
Stage 1	-	-	-	-	979
Stage 2	-	-	-	-	982

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1566	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	56	0	0	55	0	0	0	0	0	0	0
Future Vol, veh/h	0	56	0	0	55	0	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	72	0	0	71	0	0	0	0	0	0	0

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	71	0	0	72	0	0	143	143	72	143	143	71
Stage 1	-	-	-	-	-	-	72	72	-	71	71	-
Stage 2	-	-	-	-	-	-	71	71	-	72	72	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1529	-	-	1528	-	-	826	748	990	826	748	991
Stage 1	-	-	-	-	-	-	938	835	-	939	836	-
Stage 2	-	-	-	-	-	-	939	836	-	938	835	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1529	-	-	1528	-	-	826	748	990	826	748	991
Mov Cap-2 Maneuver	-	-	-	-	-	-	826	748	-	826	748	-
Stage 1	-	-	-	-	-	-	938	835	-	939	836	-
Stage 2	-	-	-	-	-	-	939	836	-	938	835	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0		0		0		0	
HCM LOS					A		A	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1529	-	-	1528	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	0	-	-	0	-	-	0
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	-

**Intersection**

Int Delay, s/veh 1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	95	34	3	94	35	11
Future Vol, veh/h	95	34	3	94	35	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	134	48	4	132	49	15

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	182	0	274
Stage 1	-	-	-	-	134
Stage 2	-	-	-	-	140
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1393	-	716
Stage 1	-	-	-	-	892
Stage 2	-	-	-	-	887
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1393	-	714
Mov Cap-2 Maneuver	-	-	-	-	714
Stage 1	-	-	-	-	892
Stage 2	-	-	-	-	884

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	754	-	-	1393	-
HCM Lane V/C Ratio	0.086	-	-	0.003	-
HCM Control Delay (s)	10.2	-	-	7.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	↕
Traffic Vol, veh/h	68	37	29	20	24	66
Future Vol, veh/h	68	37	29	20	24	66
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	56	44	30	36	100
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.6	7.6	7.9
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	65%	0%	100%	0%
Vol Thru, %	35%	59%	0%	0%
Vol Right, %	0%	41%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	105	49	24	66
LT Vol	68	0	24	0
Through Vol	37	29	0	0
RT Vol	0	20	0	66
Lane Flow Rate	159	74	36	100
Geometry Grp	2	2	7	7
Degree of Util (X)	0.197	0.086	0.056	0.121
Departure Headway (Hd)	4.464	4.187	5.565	4.36
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	807	858	646	824
Service Time	2.474	2.199	3.28	2.075
HCM Lane V/C Ratio	0.197	0.086	0.056	0.121
HCM Control Delay	8.6	7.6	8.6	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.2	0.4

**Intersection**

Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	86	132	44	62	50	64
Future Vol, veh/h	86	132	44	62	50	64
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	115	176	59	83	67	85
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right		NB	EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.7	9.2	8.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	42%	39%	0%	0%
Vol Thru, %	58%	0%	100%	0%
Vol Right, %	0%	61%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	106	218	50	64
LT Vol	44	86	0	0
Through Vol	62	0	50	0
RT Vol	0	132	0	64
Lane Flow Rate	141	291	67	85
Geometry Grp	5	2	7	7
Degree of Util (X)	0.195	0.351	0.099	0.11
Departure Headway (Hd)	4.966	4.353	5.343	4.637
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	721	825	669	771
Service Time	3.009	2.382	3.085	2.379
HCM Lane V/C Ratio	0.196	0.353	0.1	0.11
HCM Control Delay	9.2	9.7	8.7	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	1.6	0.3	0.4



## Queues

EPAP 1830

## 24: Brunswick Rd &amp; Loma Rica Dr

01/11/2021















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	54	235	25	111	378
v/c Ratio	0.09	0.07	0.24	0.03	0.19	0.26
Control Delay	16.3	2.9	11.3	6.4	14.4	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	2.9	11.3	6.4	14.4	3.4
Queue Length 50th (ft)	6	0	24	0	13	0
Queue Length 95th (ft)	35	13	108	13	64	79
Internal Link Dist (ft)	944		951			673
Turn Bay Length (ft)	165			405	410	
Base Capacity (vph)	1050	1247	1536	1309	1200	1810
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.04	0.15	0.02	0.09	0.21

## Intersection Summary

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	50	216	23	102	348
Future Volume (veh/h)	42	50	216	23	102	348
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	46	54	235	25	111	378
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	165	303	492	417	176	992
Arrive On Green	0.09	0.09	0.27	0.27	0.10	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	46	54	235	25	111	378
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.7	0.9	3.2	0.4	1.8	3.5
Cycle Q Clear(g_c), s	0.7	0.9	3.2	0.4	1.8	3.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	165	303	492	417	176	992
V/C Ratio(X)	0.28	0.18	0.48	0.06	0.63	0.38
Avail Cap(c_a), veh/h	830	895	1866	1582	1171	3040
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	9.9	9.1	8.0	12.7	3.9
Incr Delay (d2), s/veh	0.9	0.3	0.7	0.1	3.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	0.8	0.1	0.6	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.3	10.2	9.8	8.1	16.4	4.1
LnGrp LOS	B	B	A	A	B	A
Approach Vol, veh/h	100		260			489
Approach Delay, s/veh	11.6		9.6			6.9
Approach LOS	B		A			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.1	13.8			21.8	7.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	3.8	5.2			5.5	2.9
Green Ext Time (p_c), s	0.2	1.3			2.2	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.3			
HCM 6th LOS			A			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	6.8	11.4	4.6	7.0

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	1.3	0.0	0.5
Total Del/Veh (s)	5.1	6.7	10.3	6.9

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.2
Total Del/Veh (s)	6.5	8.0	0.9	4.2

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.4	2.0	1.1
Total Del/Veh (s)	16.8	6.5	10.6	10.0	9.0

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.7
Total Del/Veh (s)	8.0	13.1	13.7	35.9	16.5

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	4.6	23.1	9.0

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.6	0.0	0.4
Total Del/Veh (s)	9.0	15.4	12.9	3.6	9.5

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	2.6	1.0
Total Del/Veh (s)	9.6	9.4	5.7	8.2

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.7	0.0	0.1	0.7
Total Del/Veh (s)	6.6	7.6	8.3	7.4

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Total Zone Performance

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Denied Del/Veh (s)	1.2
Total Del/Veh (s)	186.6

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	98	130	71	60
Average Queue (ft)	59	48	30	27
95th Queue (ft)	99	95	61	53
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	5			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	114	65	91	92	76
Average Queue (ft)	60	24	40	44	31
95th Queue (ft)	101	53	78	79	64
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	94	81	35	55	4
Average Queue (ft)	46	36	8	30	0
95th Queue (ft)	76	62	31	47	4
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB	
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR	
Maximum Queue (ft)	52	63	72	97	7	103	79	74	130	86	
Average Queue (ft)	17	23	32	34	0	47	30	23	59	30	
95th Queue (ft)	45	50	61	71	3	83	60	57	99	65	
Link Distance (ft)	777	160	160	160		1486				1622	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)					115			115	360	360	
Storage Blk Time (%)						0	0				
Queuing Penalty (veh)						0	0				

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	123	152	95	127	134	77	109	134	154	60	59
Average Queue (ft)	33	62	49	31	46	22	48	43	83	17	29
95th Queue (ft)	81	123	89	93	106	57	85	100	136	46	52
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	1	1						
Queuing Penalty (veh)	0	0	0	2	2						
Storage Bay Dist (ft)			140				100		240	240	240
Storage Blk Time (%)			1	1			0	0			
Queuing Penalty (veh)			1	1			1	0			

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	58	84	42	60	204	116	50
Average Queue (ft)	11	21	4	7	104	54	3
95th Queue (ft)	37	59	21	33	177	91	34
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					4	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	50	77	86	127	105	85	78	118	83	134	98	57
Average Queue (ft)	16	36	35	51	48	38	39	57	21	65	37	26
95th Queue (ft)	44	67	72	100	87	69	68	102	55	110	74	55
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	71
Average Queue (ft)	27
95th Queue (ft)	61
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	67	108	61	61	71	53	72	54
Average Queue (ft)	29	43	23	22	25	16	27	26
95th Queue (ft)	56	87	52	47	55	44	56	48
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								



Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	96	50	107	69	63	85	55
Average Queue (ft)	37	21	42	21	11	37	26
95th Queue (ft)	73	41	84	54	41	67	48
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 12

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP 830-1930 PM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	40	3.0	0.093	4.5	LOS A	0.4	9.9	0.42	0.30	0.42	34.2
8	T1	37	3.0	0.093	4.5	LOS A	0.4	9.9	0.42	0.30	0.42	34.2
18	R2	14	3.0	0.093	4.5	LOS A	0.4	9.9	0.42	0.30	0.42	33.2
Approach		92	3.0	0.093	4.5	LOS A	0.4	9.9	0.42	0.30	0.42	34.0
East: Idaho Maryland Rd												
1	L2	151	3.0	0.137	4.5	LOS A	0.6	14.3	0.36	0.25	0.36	32.8
6	T1	161	3.0	0.230	5.4	LOS A	1.0	26.1	0.40	0.28	0.40	35.0
16	R2	93	3.0	0.230	5.4	LOS A	1.0	26.1	0.40	0.28	0.40	33.9
Approach		405	3.0	0.230	5.0	LOS A	1.0	26.1	0.38	0.27	0.38	33.8
North: Main St												
7	L2	54	3.0	0.207	5.5	LOS A	0.8	21.1	0.44	0.36	0.44	34.3
4	T1	156	3.0	0.207	5.5	LOS A	0.8	21.1	0.44	0.36	0.44	34.2
14	R2	210	3.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		419	3.0	0.207	2.8	LOS A	0.8	21.1	0.22	0.18	0.22	35.6
West: Main St												
5	L2	160	3.0	0.261	6.1	LOS A	1.1	27.7	0.47	0.39	0.47	33.0
2	T1	79	3.0	0.261	6.1	LOS A	1.1	27.7	0.47	0.39	0.47	32.9
12	R2	24	3.0	0.261	6.1	LOS A	1.1	27.7	0.47	0.39	0.47	32.0
Approach		262	3.0	0.261	6.1	LOS A	1.1	27.7	0.47	0.39	0.47	32.9
All Vehicles		1177	3.0	0.261	4.4	LOS A	1.1	27.7	0.35	0.27	0.35	34.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Intersection	
Intersection Delay, s/veh	20
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	57	313	8	0	0	0	0	177	249	146	244	0
Future Vol, veh/h	57	313	8	0	0	0	0	177	249	146	244	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	344	9	0	0	0	0	195	274	160	268	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.9	29.4	14.8
HCM LOS	B	D	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	27%	0%	100%	0%
Vol Thru, %	42%	73%	95%	0%	100%
Vol Right, %	58%	0%	5%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	426	214	165	146	244
LT Vol	0	57	0	146	0
Through Vol	177	157	157	0	244
RT Vol	249	0	8	0	0
Lane Flow Rate	468	235	181	160	268
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.799	0.465	0.35	0.318	0.493
Departure Headway (Hd)	6.141	7.135	6.964	7.125	6.615
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	585	502	515	502	542
Service Time	4.202	4.906	4.735	4.899	4.388
HCM Lane V/C Ratio	0.8	0.468	0.351	0.319	0.494
HCM Control Delay	29.4	16	13.5	13.2	15.7
HCM Lane LOS	D	C	B	B	C
HCM 95th-tile Q	7.8	2.4	1.6	1.4	2.7

Intersection	
Intersection Delay, s/veh	27.8
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	295	48	44	391	268	474
Future Vol, veh/h	295	48	44	391	268	474
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	317	52	47	420	288	510
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	26.1	18.1	34.2
HCM LOS	D	C	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	25%	0%
Vol Thru, %	0%	0%	86%	75%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	268	474	343	174	261
LT Vol	268	0	0	44	0
Through Vol	0	0	295	130	261
RT Vol	0	474	48	0	0
Lane Flow Rate	288	510	369	187	280
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.604	0.895	0.718	0.394	0.579
Departure Headway (Hd)	7.546	6.321	7.01	7.561	7.431
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	475	571	513	474	482
Service Time	5.325	4.099	5.082	5.348	5.218
HCM Lane V/C Ratio	0.606	0.893	0.719	0.395	0.581
HCM Control Delay	21.3	41.5	26.1	15.2	20
HCM Lane LOS	C	E	D	C	C
HCM 95th-tile Q	3.9	10.5	5.8	1.9	3.6

**Intersection**

Intersection Delay, s/veh	14
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	624	122	22	352	82	30
Future Vol, veh/h	624	122	22	352	82	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	657	128	23	371	86	32
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.6	11.6	10.9
HCM LOS	C	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	73%	0%	0%	16%	0%
Vol Thru, %	0%	100%	63%	84%	100%
Vol Right, %	27%	0%	37%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	112	416	330	139	235
LT Vol	82	0	0	22	0
Through Vol	0	416	208	117	235
RT Vol	30	0	122	0	0
Lane Flow Rate	118	438	347	147	247
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.204	0.657	0.496	0.24	0.398
Departure Headway (Hd)	6.235	5.404	5.143	5.88	5.8
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	577	674	705	612	622
Service Time	4.262	3.104	2.843	3.606	3.526
HCM Lane V/C Ratio	0.205	0.65	0.492	0.24	0.397
HCM Control Delay	10.9	17.8	12.8	10.5	12.3
HCM Lane LOS	B	C	B	B	B
HCM 95th-tile Q	0.8	4.9	2.8	0.9	1.9

Intersection												
Int Delay, s/veh	24.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻	↻	↻	↻		↻	↻	↻
Traffic Vol, veh/h	0	0	218	64	0	107	250	473	19	38	350	8
Future Vol, veh/h	0	0	218	64	0	107	250	473	19	38	350	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	232	68	0	114	266	503	20	40	372	9

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	-	1507	372	1618	1506	513	381	0	0	523	0	0
Stage 1	-	452	-	1045	1045	-	-	-	-	-	-	-
Stage 2	-	1055	-	573	461	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	121	674	83	121	561	1177	-	-	1043	-	-
Stage 1	0	570	-	276	306	-	-	-	-	-	-	-
Stage 2	0	302	-	505	565	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	90	674	~44	90	561	1177	-	-	1043	-	-
Mov Cap-2 Maneuver	-	90	-	~44	90	-	-	-	-	-	-	-
Stage 1	-	548	-	214	237	-	-	-	-	-	-	-
Stage 2	-	234	-	319	544	-	-	-	-	-	-	-

Approach	EB		WB			NB			SB		
HCM Control Delay, s	13.1		187.3			3			0.8		
HCM LOS	B		F								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1177	-	-	674	44	561	1043	-	-
HCM Lane V/C Ratio	0.226	-	-	0.344	1.547	0.203	0.039	-	-
HCM Control Delay (s)	8.9	-	-	13.1\$	478.6	13	8.6	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.9	-	-	1.5	6.8	0.8	0.1	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	53	77	724	520	94
Future Vol, veh/h	22	53	77	724	520	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	59	86	804	578	104

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1606	341	682	0	-	0
Stage 1	630	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	105	656	909	-	-	-
Stage 1	494	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	95	656	909	-	-	-
Mov Cap-2 Maneuver	282	-	-	-	-	-
Stage 1	447	-	-	-	-	-
Stage 2	364	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	909	-	282	656	-	-
HCM Lane V/C Ratio	0.094	-	0.087	0.09	-	-
HCM Control Delay (s)	9.4	-	19	11	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	0.3	-	-



Intersection	
Intersection Delay, s/veh	47.3
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	41	23	24	28	57	182	28	531	13	61	283	27
Future Vol, veh/h	41	23	24	28	57	182	28	531	13	61	283	27
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	44	25	26	30	61	196	30	571	14	66	304	29
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	13	17.4	84.6	19.4
HCM LOS	B	C	F	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	10%	100%	0%
Vol Thru, %	0%	98%	26%	21%	0%	91%
Vol Right, %	0%	2%	27%	68%	0%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	544	88	267	61	310
LT Vol	28	0	41	28	61	0
Through Vol	0	531	23	57	0	283
RT Vol	0	13	24	182	0	27
Lane Flow Rate	30	585	95	287	66	333
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.06	1.084	0.202	0.527	0.134	0.627
Departure Headway (Hd)	7.201	6.673	8.001	6.917	7.637	7.06
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	500	550	451	525	472	513
Service Time	4.905	4.377	6.001	4.917	5.337	4.76
HCM Lane V/C Ratio	0.06	1.064	0.211	0.547	0.14	0.649
HCM Control Delay	10.4	88.4	13	17.4	11.5	20.9
HCM Lane LOS	B	F	B	C	B	C
HCM 95th-tile Q	0.2	17.9	0.7	3	0.5	4.3

Intersection						
Int Delay, s/veh	7.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	118	160	263	405	160	105
Future Vol, veh/h	118	160	263	405	160	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	126	170	280	431	170	112

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	280	0	-	0	702 280
Stage 1	-	-	-	-	280 -
Stage 2	-	-	-	-	422 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1283	-	-	0	404 759
Stage 1	-	-	-	0	767 -
Stage 2	-	-	-	0	662 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1283	-	-	-	364 759
Mov Cap-2 Maneuver	-	-	-	-	364 -
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	662 -

Approach	EB	WB	SB
HCM Control Delay, s	3.4	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1283	-	-	364	759
HCM Lane V/C Ratio	0.098	-	-	0.468	0.147
HCM Control Delay (s)	8.1	-	-	23.3	10.6
HCM Lane LOS	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	2.4	0.5

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	15	22	517	240	95
Future Vol, veh/h	54	15	22	517	240	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	16	23	539	250	99

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	885	300	349	0	-	0
Stage 1	300	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	315	740	1210	-	-	-
Stage 1	752	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	309	740	1210	-	-	-
Mov Cap-2 Maneuver	488	-	-	-	-	-
Stage 1	738	-	-	-	-	-
Stage 2	557	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1210	-	527	-	-
HCM Lane V/C Ratio	0.019	-	0.136	-	-
HCM Control Delay (s)	8	-	12.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	78	0	0	112	0	10
Future Vol, veh/h	78	0	0	112	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	0	0	122	0	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	85	0	207
Stage 1	-	-	-	-	85
Stage 2	-	-	-	-	122
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1512	-	781
Stage 1	-	-	-	-	938
Stage 2	-	-	-	-	903
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1512	-	781
Mov Cap-2 Maneuver	-	-	-	-	781
Stage 1	-	-	-	-	938
Stage 2	-	-	-	-	903

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	974	-	-	1512	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	309	0	12	106	0	0	0	8	0	0	0
Future Vol, veh/h	0	309	0	12	106	0	0	0	8	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	368	0	14	126	0	0	0	10	0	0	0

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	126	0	0	368	0	0	522	522	368	527	522	126
Stage 1	-	-	-	-	-	-	368	368	-	154	154	-
Stage 2	-	-	-	-	-	-	154	154	-	373	368	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1460	-	-	1191	-	-	465	459	677	462	459	924
Stage 1	-	-	-	-	-	-	652	621	-	848	770	-
Stage 2	-	-	-	-	-	-	848	770	-	648	621	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1460	-	-	1191	-	-	460	453	677	451	453	924
Mov Cap-2 Maneuver	-	-	-	-	-	-	460	453	-	451	453	-
Stage 1	-	-	-	-	-	-	652	621	-	848	760	-
Stage 2	-	-	-	-	-	-	837	760	-	639	621	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0		0.8		10.4		0	
HCM LOS					B		A	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	677	1460	-	-	1191	-	-	-
HCM Lane V/C Ratio	0.014	-	-	-	0.012	-	-	-
HCM Control Delay (s)	10.4	0	-	-	8.1	0	-	0
HCM Lane LOS		B	A	-	-	A	A	-
HCM 95th %tile Q(veh)		0	0	-	-	0	-	-

Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	256	236	26	244	74	12
Future Vol, veh/h	256	236	26	244	74	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	264	243	27	252	76	12

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	507	0	570
Stage 1	-	-	-	-	264
Stage 2	-	-	-	-	306
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1058	-	483
Stage 1	-	-	-	-	780
Stage 2	-	-	-	-	747
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1058	-	470
Mov Cap-2 Maneuver	-	-	-	-	470
Stage 1	-	-	-	-	780
Stage 2	-	-	-	-	728

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	497	-	-	1058	-
HCM Lane V/C Ratio	0.178	-	-	0.025	-
HCM Control Delay (s)	13.8	-	-	8.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	109	144	132	93	46	123
Future Vol, veh/h	109	144	132	93	46	123
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	169	155	109	54	145
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	11.1	9.9	9.4
HCM LOS	B	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	43%	0%	100%	0%
Vol Thru, %	57%	59%	0%	0%
Vol Right, %	0%	41%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	253	225	46	123
LT Vol	109	0	46	0
Through Vol	144	132	0	0
RT Vol	0	93	0	123
Lane Flow Rate	298	265	54	145
Geometry Grp	2	2	7	7
Degree of Util (X)	0.4	0.335	0.095	0.205
Departure Headway (Hd)	4.835	4.56	6.315	5.102
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	741	784	564	697
Service Time	2.889	2.614	4.091	2.877
HCM Lane V/C Ratio	0.402	0.338	0.096	0.208
HCM Control Delay	11.1	9.9	9.8	9.2
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.9	1.5	0.3	0.8

**Intersection**

Intersection Delay, s/veh	9.9
Intersection LOS	A







Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	97	85	167	90	88	79
Future Vol, veh/h	97	85	167	90	88	79
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	108	94	186	100	98	88
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.7	11	8.5
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	65%	53%	0%	0%
Vol Thru, %	35%	0%	100%	0%
Vol Right, %	0%	47%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	257	182	88	79
LT Vol	167	97	0	0
Through Vol	90	0	88	0
RT Vol	0	85	0	79
Lane Flow Rate	286	202	98	88
Geometry Grp	5	2	7	7
Degree of Util (X)	0.387	0.273	0.144	0.112
Departure Headway (Hd)	4.883	4.86	5.306	4.6
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	734	736	673	775
Service Time	2.934	2.909	3.061	2.355
HCM Lane V/C Ratio	0.39	0.274	0.146	0.114
HCM Control Delay	11	9.7	9	7.9
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.8	1.1	0.5	0.4















Queues  
24: Brunswick Rd & Loma Rica Dr

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	59	198	673	147	299	345
v/c Ratio	0.28	0.32	0.80	0.19	0.71	0.23
Control Delay	32.7	8.2	28.1	3.7	34.0	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	8.2	28.1	3.7	34.0	3.1
Queue Length 50th (ft)	24	25	262	0	120	37
Queue Length 95th (ft)	59	62	#518	33	212	74
Internal Link Dist (ft)	911		875			623
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	394	730	888	830	556	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.27	0.76	0.18	0.54	0.23

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	182	619	135	275	317
Future Volume (veh/h)	54	182	619	135	275	317
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	59	198	673	147	299	345
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	233	522	755	640	355	1274
Arrive On Green	0.13	0.13	0.41	0.41	0.20	0.70
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	59	198	673	147	299	345
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	1.9	6.2	21.7	3.9	10.5	4.5
Cycle Q Clear(g_c), s	1.9	6.2	21.7	3.9	10.5	4.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	233	522	755	640	355	1274
V/C Ratio(X)	0.25	0.38	0.89	0.23	0.84	0.27
Avail Cap(c_a), veh/h	386	659	869	736	545	1415
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.7	16.0	17.3	12.1	24.3	3.6
Incr Delay (d2), s/veh	0.6	0.5	10.4	0.2	7.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.1	9.4	1.1	4.5	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.2	16.4	27.7	12.2	31.5	3.7
LnGrp LOS	C	B	C	B	C	A
Approach Vol, veh/h	257		820			644
Approach Delay, s/veh	18.4		25.0			16.6
Approach LOS	B		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	18.0	32.0			50.1	13.4
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	12.5	23.7			6.5	8.2
Green Ext Time (p_c), s	0.5	2.5			2.0	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			20.9			
HCM 6th LOS			C			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	9.5	32.0	6.2	15.7

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.1	1.3	0.0	0.6
Total Del/Veh (s)	5.4	8.9	16.3	10.1

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.2
Total Del/Veh (s)	8.3	9.2	1.0	6.1

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	1.9	0.9
Total Del/Veh (s)	14.1	8.2	11.5	12.3	10.4

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.7	0.8
Total Del/Veh (s)	9.9	13.0	13.4	34.8	18.0

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.1	7.2	25.1	12.6

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.3
Total Del/Veh (s)	11.2	19.3	17.7	5.1	12.8

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.2	1.7	0.9
Total Del/Veh (s)	18.1	18.1	11.9	15.2

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	0.0	0.2	0.4
Total Del/Veh (s)	13.7	7.3	13.8	10.0

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Total Zone Performance

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Denied Del/Veh (s)	1.1
Total Del/Veh (s)	328.5

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	113	361	116	78
Average Queue (ft)	75	138	51	28
95th Queue (ft)	116	293	94	62
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	6			
Queuing Penalty (veh)	17			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	120	117	179	120	98
Average Queue (ft)	56	41	81	70	47
95th Queue (ft)	102	88	145	113	87
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			3	0
Queuing Penalty (veh)	0			5	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	7		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	133	109	33	87	25
Average Queue (ft)	62	51	10	43	2
95th Queue (ft)	99	84	32	68	13
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	T	R	L	L	T
Maximum Queue (ft)	51	104	113	139	124	91	85	122	119
Average Queue (ft)	19	44	50	52	56	37	30	66	51
95th Queue (ft)	46	82	91	105	96	66	66	105	97
Link Distance (ft)	777	160	160	160	1486				1622
Upstream Blk Time (%)			0	0					
Queuing Penalty (veh)			0	0					
Storage Bay Dist (ft)						115	360	360	
Storage Blk Time (%)					0				
Queuing Penalty (veh)					0				

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	144	162	102	170	165	66	95	184	201	83	94
Average Queue (ft)	50	72	60	58	77	19	44	81	117	28	42
95th Queue (ft)	112	139	99	138	152	51	76	160	181	66	76
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	3	3						
Queuing Penalty (veh)	0	1	0	8	10						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	3		0	0		0		
Queuing Penalty (veh)			2	3		0	0		0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	100	101	105	119	219	226	345
Average Queue (ft)	31	31	21	28	158	128	59
95th Queue (ft)	74	76	71	85	230	212	232
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					17	8	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	92	102	138	138	134	102	156	212	64	132	103	76
Average Queue (ft)	36	55	66	80	57	49	70	113	16	60	37	35
95th Queue (ft)	71	85	116	121	98	88	126	184	46	106	77	67
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)						0	1					
Queuing Penalty (veh)						0	1					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	87
Average Queue (ft)	32
95th Queue (ft)	67
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	133	192	84	118	127	180	252	118
Average Queue (ft)	55	92	29	51	60	39	125	30
95th Queue (ft)	106	166	64	96	112	104	217	75
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)				0		0	1	
Queuing Penalty (veh)				0		0	3	



Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	186	116	153	132	144	128	81
Average Queue (ft)	83	29	71	57	56	56	39
95th Queue (ft)	155	78	130	111	120	101	68
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	1	0					

Zone Summary

Zone wide Queuing Penalty: 61

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project AM Peak  
To Centennial  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	36	3.0	0.251	7.8	LOS A	1.1	27.7	0.62	0.61	0.62	33.3
8	T1	67	3.0	0.251	7.8	LOS A	1.1	27.7	0.62	0.61	0.62	33.2
18	R2	83	3.0	0.251	7.8	LOS A	1.1	27.7	0.62	0.61	0.62	32.3
Approach		186	3.0	0.251	7.8	LOS A	1.1	27.7	0.62	0.61	0.62	32.8
East: Idaho Maryland Rd												
1	L2	257	3.0	0.265	6.4	LOS A	1.2	29.7	0.50	0.43	0.50	31.9
6	T1	141	3.0	0.425	8.6	LOS A	2.2	55.2	0.58	0.52	0.58	33.2
16	R2	270	3.0	0.425	8.6	LOS A	2.2	55.2	0.58	0.52	0.58	32.2
Approach		668	3.0	0.425	7.7	LOS A	2.2	55.2	0.55	0.48	0.55	32.3
North: Main St												
7	L2	129	3.0	0.331	7.3	LOS A	1.4	36.6	0.53	0.49	0.53	32.9
4	T1	183	3.0	0.331	7.3	LOS A	1.4	36.6	0.53	0.49	0.53	32.9
14	R2	207	3.0	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		519	3.0	0.331	4.4	LOS A	1.4	36.6	0.32	0.29	0.32	34.4
West: Main St												
5	L2	276	3.0	0.541	12.0	LOS B	3.8	98.6	0.69	0.83	1.07	30.5
2	T1	163	3.0	0.541	12.0	LOS B	3.8	98.6	0.69	0.83	1.07	30.4
12	R2	14	3.0	0.541	12.0	LOS B	3.8	98.6	0.69	0.83	1.07	29.6
Approach		453	3.0	0.541	12.0	LOS B	3.8	98.6	0.69	0.83	1.07	30.4
All Vehicles		1826	3.0	0.541	7.8	LOS A	3.8	98.6	0.53	0.53	0.62	32.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\16-20 EPAPPP Centennial\4.1 EPAPPP AM Peak Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	16.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	60	282	3	0	0	0	0	122	156	174	331	0
Future Vol, veh/h	60	282	3	0	0	0	0	122	156	174	331	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	313	3	0	0	0	0	136	173	193	368	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.1	16.1	17.4
HCM LOS	B	C	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	30%	0%	100%	0%
Vol Thru, %	44%	70%	98%	0%	100%
Vol Right, %	56%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	278	201	144	174	331
LT Vol	0	60	0	174	0
Through Vol	122	141	141	0	331
RT Vol	156	0	3	0	0
Lane Flow Rate	309	223	160	193	368
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.531	0.435	0.304	0.363	0.639
Departure Headway (Hd)	6.187	7.004	6.837	6.767	6.259
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	581	514	525	530	577
Service Time	4.241	4.759	4.592	4.524	4.015
HCM Lane V/C Ratio	0.532	0.434	0.305	0.364	0.638
HCM Control Delay	16.1	15.1	12.6	13.4	19.5
HCM Lane LOS	C	C	B	B	C
HCM 95th-tile Q	3.1	2.2	1.3	1.6	4.5

Intersection	
Intersection Delay, s/veh	38.9
Intersection LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	220	53	66	776	169	248
Future Vol, veh/h	220	53	66	776	169	248
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	244	59	73	862	188	276
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	18.1	56.8	16.4
HCM LOS	C	F	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	20%	0%
Vol Thru, %	0%	0%	81%	80%	100%
Vol Right, %	0%	100%	19%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	169	248	273	325	517
LT Vol	169	0	0	66	0
Through Vol	0	0	220	259	517
RT Vol	0	248	53	0	0
Lane Flow Rate	188	276	303	361	575
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.411	0.512	0.559	0.671	1.053
Departure Headway (Hd)	8.069	6.841	6.793	6.698	6.595
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	449	529	534	541	552
Service Time	5.769	4.541	4.793	4.433	4.329
HCM Lane V/C Ratio	0.419	0.522	0.567	0.667	1.042
HCM Control Delay	16.3	16.5	18.1	22.1	78.6
HCM Lane LOS	C	C	C	C	F
HCM 95th-tile Q	2	2.9	3.4	5	16.6

<b>Intersection</b>	
Intersection Delay, s/veh	22.3
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	447	72	23	717	93	30
Future Vol, veh/h	447	72	23	717	93	30
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	514	83	26	824	107	34
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.2	29	12.1
HCM LOS	C	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	76%	0%	0%	9%	0%
Vol Thru, %	0%	100%	67%	91%	100%
Vol Right, %	24%	0%	33%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	298	221	262	478
LT Vol	93	0	0	23	0
Through Vol	0	298	149	239	478
RT Vol	30	0	72	0	0
Lane Flow Rate	141	343	254	301	549
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.263	0.58	0.414	0.488	0.884
Departure Headway (Hd)	6.708	6.101	5.87	5.839	5.794
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	536	593	612	617	626
Service Time	4.746	3.842	3.611	3.573	3.528
HCM Lane V/C Ratio	0.263	0.578	0.415	0.488	0.877
HCM Control Delay	12.1	17	12.7	14	37.2
HCM Lane LOS	B	C	B	B	E
HCM 95th-tile Q	1	3.7	2	2.7	10.5

Intersection												
Int Delay, s/veh	13.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↖		↗	↖	↖		↖	↗	↗
Traffic Vol, veh/h	0	0	240	25	0	76	299	499	57	94	476	14
Future Vol, veh/h	0	0	240	25	0	76	299	499	57	94	476	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	50	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	247	26	0	78	308	514	59	97	491	14

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	-	491	1976	-	544	505	0	0	573	0	0
Stage 1	-	-	-	1160	-	-	-	-	-	-	-	-
Stage 2	-	-	-	816	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	7.12	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	6.12	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	3.518	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	578	46	0	539	1060	-	-	1000	-	-
Stage 1	0	0	-	238	0	-	-	-	-	-	-	-
Stage 2	0	0	-	371	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	-	578	~ 19	-	539	1060	-	-	1000	-	-
Mov Cap-2 Maneuver	-	-	-	~ 19	-	-	-	-	-	-	-	-
Stage 1	-	-	-	169	-	-	-	-	-	-	-	-
Stage 2	-	-	-	192	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.8		164.1		3.4		1.4	
HCM LOS	C		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1060	-	-	578	19	539	1000	-	-
HCM Lane V/C Ratio	0.291	-	-	0.428	1.356	0.145	0.097	-	-
HCM Control Delay (s)	9.8	-	-	15.8	624.1	12.8	9	-	-
HCM Lane LOS	A	-	-	C	F	B	A	-	-
HCM 95th %tile Q(veh)	1.2	-	-	2.1	3.6	0.5	0.3	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	94	66	33	759	694	42
Future Vol, veh/h	94	66	33	759	694	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	69	35	799	731	44

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1622	388	775	0	-	0
Stage 1	753	-	-	-	-	-
Stage 2	869	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	103	611	839	-	-	-
Stage 1	427	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	99	611	839	-	-	-
Mov Cap-2 Maneuver	290	-	-	-	-	-
Stage 1	409	-	-	-	-	-
Stage 2	409	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.7	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	839	-	290	611	-	-
HCM Lane V/C Ratio	0.041	-	0.341	0.114	-	-
HCM Control Delay (s)	9.5	-	23.7	11.6	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.5	0.4	-	-

Intersection	
Intersection Delay, s/veh	37.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	30	29	27	25	44	85	21	393	36	153	550	33
Future Vol, veh/h	30	29	27	25	44	85	21	393	36	153	550	33
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	29	27	25	44	86	21	397	36	155	556	33
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	12.1	13	27.7	51.5
HCM LOS	B	B	D	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	35%	16%	100%	0%
Vol Thru, %	0%	92%	34%	29%	0%	94%
Vol Right, %	0%	8%	31%	55%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	21	429	86	154	153	583
LT Vol	21	0	30	25	153	0
Through Vol	0	393	29	44	0	550
RT Vol	0	36	27	85	0	33
Lane Flow Rate	21	433	87	156	155	589
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.042	0.781	0.179	0.3	0.287	1.002
Departure Headway (Hd)	7.055	6.485	7.418	6.951	6.675	6.126
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	509	559	483	516	541	595
Service Time	4.774	4.204	5.475	4.999	4.389	3.84
HCM Lane V/C Ratio	0.041	0.775	0.18	0.302	0.287	0.99
HCM Control Delay	10.1	28.6	12.1	13	12.1	61.9
HCM Lane LOS	B	D	B	B	B	F
HCM 95th-tile Q	0.1	7.2	0.6	1.3	1.2	14.9



Intersection						
Int Delay, s/veh	47.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	78	226	239	273	409	116
Future Vol, veh/h	78	226	239	273	409	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	246	260	297	445	126

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	260	0	-	0	676
Stage 1	-	-	-	-	260
Stage 2	-	-	-	-	416
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1304	-	-	0 ~ 419	779
Stage 1	-	-	-	0	783
Stage 2	-	-	-	0	666
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1304	-	-	- ~ 392	779
Mov Cap-2 Maneuver	-	-	-	- ~ 392	-
Stage 1	-	-	-	-	732
Stage 2	-	-	-	-	666

Approach	EB	WB	SB
HCM Control Delay, s	2	0	95.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1304	-	-	392	779
HCM Lane V/C Ratio	0.065	-	-	1.134	0.162
HCM Control Delay (s)	8	-	-	119.2	10.5
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	16.6	0.6

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	22	15	365	537	64
Future Vol, veh/h	85	22	15	365	537	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	24	16	397	584	70

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1048	619	654	0	-	0
Stage 1	619	-	-	-	-	-
Stage 2	429	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	252	489	933	-	-	-
Stage 1	537	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	248	489	933	-	-	-
Mov Cap-2 Maneuver	443	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	657	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	933	-	452	-	-
HCM Lane V/C Ratio	0.017	-	0.257	-	-
HCM Control Delay (s)	8.9	-	15.7	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	76	0	0	98	0	10
Future Vol, veh/h	76	0	0	98	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	0	0	107	0	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	83	0	190
Stage 1	-	-	-	-	83
Stage 2	-	-	-	-	107
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1514	-	799
Stage 1	-	-	-	-	940
Stage 2	-	-	-	-	917
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1514	-	799
Mov Cap-2 Maneuver	-	-	-	-	799
Stage 1	-	-	-	-	940
Stage 2	-	-	-	-	917

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	976	-	-	1514	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	114	0	8	261	0	0	0	12	0	0	0
Future Vol, veh/h	0	114	0	8	261	0	0	0	12	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	152	0	11	348	0	0	0	16	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	348	0	0	152	0	0	522	522	152	530	522	348
Stage 1	-	-	-	-	-	-	152	152	-	370	370	-
Stage 2	-	-	-	-	-	-	370	370	-	160	152	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1211	-	-	1429	-	-	465	459	894	460	459	695
Stage 1	-	-	-	-	-	-	850	772	-	650	620	-
Stage 2	-	-	-	-	-	-	650	620	-	842	772	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1211	-	-	1429	-	-	461	454	894	449	454	695
Mov Cap-2 Maneuver	-	-	-	-	-	-	461	454	-	449	454	-
Stage 1	-	-	-	-	-	-	850	772	-	650	614	-
Stage 2	-	-	-	-	-	-	644	614	-	827	772	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.2			9.1			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	894	1211	-	-	1429	-	-	-
HCM Lane V/C Ratio	0.018	-	-	-	0.007	-	-	-
HCM Control Delay (s)	9.1	0	-	-	7.5	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	35.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	329	120	12	425	245	37
Future Vol, veh/h	329	120	12	425	245	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	150	15	531	306	46

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	561	0	972
Stage 1	-	-	-	-	411
Stage 2	-	-	-	-	561
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1010	-	~ 280
Stage 1	-	-	-	-	669
Stage 2	-	-	-	-	571
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1010	-	~ 276
Mov Cap-2 Maneuver	-	-	-	-	~ 276
Stage 1	-	-	-	-	669
Stage 2	-	-	-	-	562

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	148.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	298	-	-	1010	-
HCM Lane V/C Ratio	1.183	-	-	0.015	-
HCM Control Delay (s)	148.4	-	-	8.6	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	15.4	-	-	0	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	15.4
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	212	131	234	75	112	208
Future Vol, veh/h	212	131	234	75	112	208
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	249	154	275	88	132	245
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	18.3	15.3	12.4
HCM LOS	C	C	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	62%	0%	100%	0%
Vol Thru, %	38%	76%	0%	0%
Vol Right, %	0%	24%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	343	309	112	208
LT Vol	212	0	112	0
Through Vol	131	234	0	0
RT Vol	0	75	0	208
Lane Flow Rate	404	364	132	245
Geometry Grp	2	2	7	7
Degree of Util (X)	0.638	0.556	0.26	0.399
Departure Headway (Hd)	5.695	5.508	7.091	5.869
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	634	654	506	612
Service Time	3.745	3.56	4.845	3.622
HCM Lane V/C Ratio	0.637	0.557	0.261	0.4
HCM Control Delay	18.3	15.3	12.3	12.5
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	4.6	3.4	1	1.9

**Intersection**







Intersection Delay, s/veh 15.9  
Intersection LOS C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	Y
Traffic Vol, veh/h	144	189	130	172	179	179
Future Vol, veh/h	144	189	130	172	179	179
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	228	157	207	216	216
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	18.2	17.8	12.1
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	43%	43%	0%	0%
Vol Thru, %	57%	0%	100%	0%
Vol Right, %	0%	57%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	302	333	179	179
LT Vol	130	144	0	0
Through Vol	172	0	179	0
RT Vol	0	189	0	179
Lane Flow Rate	364	401	216	216
Geometry Grp	5	2	7	7
Degree of Util (X)	0.603	0.634	0.379	0.336
Departure Headway (Hd)	5.971	5.689	6.329	5.615
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	604	634	567	636
Service Time	4.032	3.748	4.095	3.382
HCM Lane V/C Ratio	0.603	0.632	0.381	0.34
HCM Control Delay	17.8	18.2	12.9	11.2
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	4	4.5	1.8	1.5













Queues  
24: Brunswick Rd & Loma Rica Dr

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	358	503	49	132	641
v/c Ratio	0.48	0.49	0.72	0.08	0.41	0.50
Control Delay	30.0	8.5	23.5	5.1	28.6	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	8.5	23.5	5.1	28.6	7.4
Queue Length 50th (ft)	52	36	150	0	43	109
Queue Length 95th (ft)	126	107	303	19	103	202
Internal Link Dist (ft)	901		887			643
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	474	1001	1062	923	670	1607
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.36	0.47	0.05	0.20	0.40
<b>Intersection Summary</b>						



HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project PM Peak  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	146	329	463	45	121	590
Future Volume (veh/h)	146	329	463	45	121	590
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	159	358	503	49	132	641
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	427	534	626	530	174	992
Arrive On Green	0.25	0.25	0.34	0.34	0.10	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	159	358	503	49	132	641
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	3.8	10.0	12.7	1.1	3.7	12.5
Cycle Q Clear(g_c), s	3.8	10.0	12.7	1.1	3.7	12.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	427	534	626	530	174	992
V/C Ratio(X)	0.37	0.67	0.80	0.09	0.76	0.65
Avail Cap(c_a), veh/h	484	585	1089	923	683	1774
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	14.1	15.1	11.3	22.2	8.1
Incr Delay (d2), s/veh	0.5	2.6	2.5	0.1	6.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.3	4.4	0.3	1.6	3.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.4	16.8	17.6	11.4	28.9	8.8
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	517		552			773
Approach Delay, s/veh	16.6		17.0			12.3
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.2	23.2			33.3	17.3
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	5.7	14.7			14.5	12.0
Green Ext Time (p_c), s	0.3	2.7			4.3	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.9			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	11.0	24.8	6.5	12.4

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.0	0.0	0.4
Total Del/Veh (s)	6.2	9.2	19.9	11.1

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.5	0.3
Total Del/Veh (s)	11.6	9.9	1.8	7.3

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.2
Total Del/Veh (s)	18.4	10.4	17.5	17.2	14.6

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.7	0.8
Total Del/Veh (s)	15.2	15.4	20.6	37.3	21.5

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.5	9.8	28.1	13.9

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.5
Total Del/Veh (s)	17.6	35.9	31.5	13.6	24.4

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	2.7	0.9
Total Del/Veh (s)	13.4	13.9	13.7	13.7

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.4	0.1	0.2	1.1
Total Del/Veh (s)	19.3	11.6	15.7	15.7

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Total Zone Performance

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Denied Del/Veh (s)	1.4
Total Del/Veh (s)	770.4

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	112	242	102	106
Average Queue (ft)	75	102	48	48
95th Queue (ft)	116	208	88	89
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	8			
Queuing Penalty (veh)	23			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	142	115	191	122	110
Average Queue (ft)	85	34	83	80	64
95th Queue (ft)	141	81	149	124	107
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			7	2
Queuing Penalty (veh)	5			10	3
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	7		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	166	169	38	78	47
Average Queue (ft)	78	68	14	42	5
95th Queue (ft)	134	123	39	66	26
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	40	111	100	165	29	236	133	210	244	194
Average Queue (ft)	13	49	50	85	2	94	65	74	119	64
95th Queue (ft)	38	91	87	154	17	172	123	166	199	132
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0		0						
Queuing Penalty (veh)		0		1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						4	2			0
Queuing Penalty (veh)						6	4			0

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	173	190	102	171	181	109	177	226	229	113	104
Average Queue (ft)	101	134	63	62	99	37	86	121	146	36	47
95th Queue (ft)	186	208	102	144	184	85	148	201	206	85	81
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	7	2	3	8						
Queuing Penalty (veh)	4	25	0	12	26						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	3		0	6	0	0		
Queuing Penalty (veh)			6	4		0	2	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	145	153	184	337	224	217	234	389
Average Queue (ft)	56	60	64	92	9	140	173	97
95th Queue (ft)	119	124	158	235	93	226	257	308
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	13	26	
Queuing Penalty (veh)				1	0	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	123	147	178	192	222	175	260	375	264	309	265	149
Average Queue (ft)	62	82	102	109	98	88	132	216	100	174	92	66
95th Queue (ft)	111	129	165	170	174	153	229	327	212	265	181	120
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)			0	0	0	3	8		0	1	0	
Queuing Penalty (veh)			0	0	1	10	11		0	3	0	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	117
Average Queue (ft)	55
95th Queue (ft)	103
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	190	222	142	136	164	102	134	128
Average Queue (ft)	85	97	58	52	69	42	59	56
95th Queue (ft)	156	193	112	99	129	81	108	102
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	0	3						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			0	0				
Queuing Penalty (veh)			1	0				

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	461	180	211	113	118	180	75
Average Queue (ft)	180	108	106	39	36	91	34
95th Queue (ft)	371	203	184	95	95	156	62
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)	1		0				
Queuing Penalty (veh)	0		1				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	10	1					
Queuing Penalty (veh)	40	4					

Zone Summary

Zone wide Queuing Penalty: 216



# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project PM Peak  
To Centennial  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	75	3.0	0.245	6.6	LOS A	1.1	28.6	0.54	0.47	0.54	33.4
8	T1	71	3.0	0.245	6.6	LOS A	1.1	28.6	0.54	0.47	0.54	33.4
18	R2	73	3.0	0.245	6.6	LOS A	1.1	28.6	0.54	0.47	0.54	32.4
Approach		218	3.0	0.245	6.6	LOS A	1.1	28.6	0.54	0.47	0.54	33.1
East: Idaho Maryland Rd												
1	L2	372	3.0	0.375	7.7	LOS A	1.8	46.7	0.54	0.46	0.54	31.3
6	T1	258	3.0	0.493	9.5	LOS A	3.3	83.3	0.61	0.58	0.72	32.8
16	R2	234	3.0	0.493	9.5	LOS A	3.3	83.3	0.61	0.58	0.72	31.8
Approach		863	3.0	0.493	8.7	LOS A	3.3	83.3	0.58	0.53	0.64	31.9
North: Main St												
7	L2	77	3.0	0.389	9.8	LOS A	1.8	47.2	0.65	0.70	0.80	32.2
4	T1	213	3.0	0.389	9.8	LOS A	1.8	47.2	0.65	0.70	0.80	32.1
14	R2	329	3.0	0.203	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		619	3.0	0.389	4.6	LOS A	1.8	47.2	0.30	0.33	0.38	34.6
West: Main St												
5	L2	207	3.0	0.452	10.7	LOS B	2.5	63.9	0.66	0.75	0.92	31.0
2	T1	107	3.0	0.452	10.7	LOS B	2.5	63.9	0.66	0.75	0.92	30.9
12	R2	35	3.0	0.452	10.7	LOS B	2.5	63.9	0.66	0.75	0.92	30.1
Approach		349	3.0	0.452	10.7	LOS B	2.5	63.9	0.66	0.75	0.92	30.9
All Vehicles		2049	3.0	0.493	7.6	LOS A	3.3	83.3	0.50	0.50	0.60	32.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	15	96	6	0	0	0	0	86	100	89	100	0
Future Vol, veh/h	15	96	6	0	0	0	0	86	100	89	100	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	109	7	0	0	0	0	98	114	101	114	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9	9.8	9.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	24%	0%	100%	0%
Vol Thru, %	46%	76%	89%	0%	100%
Vol Right, %	54%	0%	11%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	186	63	54	89	100
LT Vol	0	15	0	89	0
Through Vol	86	48	48	0	100
RT Vol	100	0	6	0	0
Lane Flow Rate	211	72	61	101	114
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.284	0.113	0.094	0.157	0.16
Departure Headway (Hd)	4.83	5.688	5.49	5.587	5.084
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	744	629	652	642	705
Service Time	2.864	3.432	3.234	3.323	2.82
HCM Lane V/C Ratio	0.284	0.114	0.094	0.157	0.162
HCM Control Delay	9.8	9.2	8.8	9.4	8.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	1.2	0.4	0.3	0.6	0.6

Intersection	
Intersection Delay, s/veh	17.2
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	197	19	32	204	125	367
Future Vol, veh/h	197	19	32	204	125	367
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	256	25	42	265	162	477
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	15.9	12.5	20.1
HCM LOS	C	B	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	32%	0%
Vol Thru, %	0%	0%	91%	68%	100%
Vol Right, %	0%	100%	9%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	367	216	100	136
LT Vol	125	0	0	32	0
Through Vol	0	0	197	68	136
RT Vol	0	367	19	0	0
Lane Flow Rate	162	477	281	130	177
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.307	0.74	0.502	0.25	0.332
Departure Headway (Hd)	6.807	5.592	6.439	6.933	6.769
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	528	643	558	517	530
Service Time	4.562	3.346	4.496	4.697	4.534
HCM Lane V/C Ratio	0.307	0.742	0.504	0.251	0.334
HCM Control Delay	12.6	22.7	15.9	12	12.9
HCM Lane LOS	B	C	C	B	B
HCM 95th-tile Q	1.3	6.5	2.8	1	1.4

**Intersection**

Intersection Delay, s/veh 11.5  
Intersection LOS B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	475	68	20	175	44	7
Future Vol, veh/h	475	68	20	175	44	7
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	609	87	26	224	56	9
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	12.4	9.5	9.6
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	86%	0%	0%	26%	0%
Vol Thru, %	0%	100%	70%	74%	100%
Vol Right, %	14%	0%	30%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	51	317	226	78	117
LT Vol	44	0	0	20	0
Through Vol	0	317	158	58	117
RT Vol	7	0	68	0	0
Lane Flow Rate	65	406	290	100	150
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.106	0.559	0.382	0.153	0.223
Departure Headway (Hd)	5.857	4.955	4.744	5.498	5.37
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	609	727	757	651	667
Service Time	3.914	2.689	2.478	3.246	3.118
HCM Lane V/C Ratio	0.107	0.558	0.383	0.154	0.225
HCM Control Delay	9.6	13.8	10.4	9.2	9.7
HCM Lane LOS	A	B	B	A	A
HCM 95th-tile Q	0.4	3.5	1.8	0.5	0.8

Intersection												
Int Delay, s/veh	6.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	0	0	162	46	0	55	132	231	10	11	230	3
Future Vol, veh/h	0	0	162	46	0	55	132	231	10	11	230	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	195	55	0	66	159	278	12	13	277	4

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	911	277	1005	909	284	281	0	0	290	0	0
Stage 1	-	303	-	602	602	-	-	-	-	-	-	-
Stage 2	-	608	-	403	307	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	274	762	220	275	755	1282	-	-	1272	-	-
Stage 1	0	664	-	486	489	-	-	-	-	-	-	-
Stage 2	0	486	-	624	661	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	238	762	147	238	755	1282	-	-	1272	-	-
Mov Cap-2 Maneuver	-	238	-	147	238	-	-	-	-	-	-	-
Stage 1	-	657	-	426	428	-	-	-	-	-	-	-
Stage 2	-	426	-	459	654	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.3		25.4		2.9		0.4	
HCM LOS	B		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1282	-	-	762	147	755	1272	-	-
HCM Lane V/C Ratio	0.124	-	-	0.256	0.377	0.088	0.01	-	-
HCM Control Delay (s)	8.2	-	-	11.3	43.6	10.2	7.9	-	-
HCM Lane LOS	A	-	-	B	E	B	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1	1.6	0.3	0	-	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	36	44	360	374	49
Future Vol, veh/h	13	36	44	360	374	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	47	58	474	492	64

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1114	278	556	0	-	0
Stage 1	524	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	216	720	1013	-	-	-
Stage 1	560	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	204	720	1013	-	-	-
Mov Cap-2 Maneuver	406	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	553	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1013	-	406	720	-	-
HCM Lane V/C Ratio	0.057	-	0.042	0.066	-	-
HCM Control Delay (s)	8.8	-	14.3	10.4	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	20	10	20	29	26	83	24	342	6	30	184	11
Future Vol, veh/h	20	10	20	29	26	83	24	342	6	30	184	11
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	11	22	32	29	92	27	380	7	33	204	12
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.4	10.1	15.2	10.8
HCM LOS	A	B	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	40%	21%	100%	0%
Vol Thru, %	0%	98%	20%	19%	0%	94%
Vol Right, %	0%	2%	40%	60%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	24	348	50	138	30	195
LT Vol	24	0	20	29	30	0
Through Vol	0	342	10	26	0	184
RT Vol	0	6	20	83	0	11
Lane Flow Rate	27	387	56	153	33	217
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.044	0.586	0.09	0.232	0.057	0.336
Departure Headway (Hd)	5.969	5.452	5.807	5.439	6.124	5.578
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	603	665	616	659	586	646
Service Time	3.669	3.152	3.851	3.477	3.853	3.308
HCM Lane V/C Ratio	0.045	0.582	0.091	0.232	0.056	0.336
HCM Control Delay	8.9	15.6	9.4	10.1	9.2	11.1
HCM Lane LOS	A	C	A	B	A	B
HCM 95th-tile Q	0.1	3.8	0.3	0.9	0.2	1.5

Intersection						
Int Delay, s/veh	5.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	52	123	127	245	128	47
Future Vol, veh/h	52	123	127	245	128	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	154	159	306	160	59

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	159	0	-	0	443
Stage 1	-	-	-	-	159
Stage 2	-	-	-	-	284
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1420	-	-	0	572
Stage 1	-	-	-	0	870
Stage 2	-	-	-	0	764
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1420	-	-	-	546
Mov Cap-2 Maneuver	-	-	-	-	546
Stage 1	-	-	-	-	830
Stage 2	-	-	-	-	764

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1420	-	-	546	886
HCM Lane V/C Ratio	0.046	-	-	0.293	0.066
HCM Control Delay (s)	7.7	-	-	14.3	9.4
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.2	0.2



Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	15	22	317	138	95
Future Vol, veh/h	54	15	22	317	138	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	17	25	360	157	108

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	621	211	265	0	-	0
Stage 1	211	-	-	-	-	-
Stage 2	410	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	451	829	1299	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	442	829	1299	-	-	-
Mov Cap-2 Maneuver	594	-	-	-	-	-
Stage 1	808	-	-	-	-	-
Stage 2	670	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1299	-	633	-	-
HCM Lane V/C Ratio	0.019	-	0.124	-	-
HCM Control Delay (s)	7.8	-	11.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	40	0	0	61	0	10
Future Vol, veh/h	40	0	0	61	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	0	0	66	0	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	43	0	109
Stage 1	-	-	-	-	43
Stage 2	-	-	-	-	66
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1566	-	888
Stage 1	-	-	-	-	979
Stage 2	-	-	-	-	957
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1566	-	888
Mov Cap-2 Maneuver	-	-	-	-	888
Stage 1	-	-	-	-	979
Stage 2	-	-	-	-	957

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1027	-	-	1566	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	176	0	12	66	0	0	0	8	0	0	0
Future Vol, veh/h	0	176	0	12	66	0	0	0	8	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	71	71	71	71	71	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	248	0	17	93	0	0	0	11	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	93	0	0	248	0	0	375	375	248	381	375	93
Stage 1	-	-	-	-	-	-	248	248	-	127	127	-
Stage 2	-	-	-	-	-	-	127	127	-	254	248	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1501	-	-	1318	-	-	582	556	791	577	556	964
Stage 1	-	-	-	-	-	-	756	701	-	877	791	-
Stage 2	-	-	-	-	-	-	877	791	-	750	701	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1501	-	-	1318	-	-	576	548	791	563	548	964
Mov Cap-2 Maneuver	-	-	-	-	-	-	576	548	-	563	548	-
Stage 1	-	-	-	-	-	-	756	701	-	877	780	-
Stage 2	-	-	-	-	-	-	865	780	-	739	701	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.2			9.6			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	791	1501	-	-	1318	-	-	-
HCM Lane V/C Ratio	0.014	-	-	-	0.013	-	-	-
HCM Control Delay (s)	9.6	0	-	-	7.8	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	186	173	10	154	39	6
Future Vol, veh/h	186	173	10	154	39	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	248	231	13	205	52	8

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	479	0	479
Stage 1	-	-	-	-	248
Stage 2	-	-	-	-	231
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1083	-	545
Stage 1	-	-	-	-	793
Stage 2	-	-	-	-	807
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1083	-	538
Mov Cap-2 Maneuver	-	-	-	-	538
Stage 1	-	-	-	-	793
Stage 2	-	-	-	-	797

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	562	-	-	1083	-
HCM Lane V/C Ratio	0.107	-	-	0.012	-
HCM Control Delay (s)	12.2	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	48	124	89	47	30	59
Future Vol, veh/h	48	124	89	47	30	59
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	146	105	55	35	69
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.9	8.2	8.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	28%	0%	100%	0%
Vol Thru, %	72%	65%	0%	0%
Vol Right, %	0%	35%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	172	136	30	59
LT Vol	48	0	30	0
Through Vol	124	89	0	0
RT Vol	0	47	0	59
Lane Flow Rate	202	160	35	69
Geometry Grp	2	2	7	7
Degree of Util (X)	0.248	0.187	0.057	0.089
Departure Headway (Hd)	4.416	4.207	5.834	4.626
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	815	854	615	775
Service Time	2.432	2.223	3.56	2.351
HCM Lane V/C Ratio	0.248	0.187	0.057	0.089
HCM Control Delay	8.9	8.2	8.9	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1	0.7	0.2	0.3







Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	49	89	38	43	46
Future Vol, veh/h	32	49	89	38	43	46
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	63	114	49	55	59
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right		NB	EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.9	8.7	7.6
HCM LOS	A	A	A













Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	70%	40%	0%	0%
Vol Thru, %	30%	0%	100%	0%
Vol Right, %	0%	60%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	127	81	43	46
LT Vol	89	32	0	0
Through Vol	38	0	43	0
RT Vol	0	49	0	46
Lane Flow Rate	163	104	55	59
Geometry Grp	5	2	7	7
Degree of Util (X)	0.201	0.124	0.075	0.069
Departure Headway (Hd)	4.543	4.282	4.906	4.203
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	795	841	735	857
Service Time	2.543	2.287	2.606	1.903
HCM Lane V/C Ratio	0.205	0.124	0.075	0.069
HCM Control Delay	8.7	7.9	8	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.4	0.2	0.2

Queues  
24: Brunswick Rd & Loma Rica Dr

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	30	87	364	130	230	224
v/c Ratio	0.11	0.14	0.57	0.21	0.48	0.14
Control Delay	24.2	3.4	17.3	4.3	19.9	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	3.4	17.3	4.3	19.9	2.2
Queue Length 50th (ft)	5	0	48	0	32	0
Queue Length 95th (ft)	35	21	198	31	146	42
Internal Link Dist (ft)	1030		917			643
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	639	964	1387	1209	902	1711
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.09	0.26	0.11	0.25	0.13
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project 0630  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	28	80	335	120	212	206
Future Volume (veh/h)	28	80	335	120	212	206
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	30	87	364	130	230	224
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	166	419	538	456	305	1115
Arrive On Green	0.10	0.10	0.29	0.29	0.18	0.61
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	30	87	364	130	230	224
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.6	1.6	6.4	2.4	4.6	2.0
Cycle Q Clear(g_c), s	0.6	1.6	6.4	2.4	4.6	2.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	166	419	538	456	305	1115
V/C Ratio(X)	0.18	0.21	0.68	0.28	0.75	0.20
Avail Cap(c_a), veh/h	674	871	1516	1285	951	2470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	10.2	11.3	9.9	14.2	3.1
Incr Delay (d2), s/veh	0.5	0.2	1.5	0.3	3.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	1.8	0.5	1.6	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.7	10.5	12.8	10.2	18.0	3.2
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	117		494			454
Approach Delay, s/veh	11.8		12.1			10.7
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.5	16.5			28.0	8.4
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.6	8.4			4.0	3.6
Green Ext Time (p_c), s	0.5	2.3			1.2	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.5			
HCM 6th LOS			B			





1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	2.8	9.6	4.3	5.1

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.5	0.0	0.5
Total Del/Veh (s)	4.4	5.8	8.2	6.1

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	5.5	7.5	0.5	3.8

8: Main St & Maltman Dr/Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.3	2.1	1.0
Total Del/Veh (s)	14.1	4.4	7.5	6.6	5.9

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.7	2.9	0.9
Total Del/Veh (s)	4.6	9.8	14.2	38.4	16.8

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.4	3.9	20.8	8.7

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	1.4	0.0	0.2
Total Del/Veh (s)	5.6	8.9	11.1	1.1	5.2

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	1.6	0.8
Total Del/Veh (s)	11.2	11.2	7.4	9.3

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.7	0.0	0.1	0.5
Total Del/Veh (s)	7.1	5.6	7.3	6.2

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Total Zone Performance

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Denied Del/Veh (s)	1.1
Total Del/Veh (s)	71.9

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	90	105	60	52
Average Queue (ft)	31	48	22	16
95th Queue (ft)	69	86	52	42
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	1			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	97	63	92	100	87
Average Queue (ft)	42	23	35	43	28
95th Queue (ft)	76	53	73	85	67
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	61	61	31	52	2
Average Queue (ft)	35	26	7	30	0
95th Queue (ft)	52	52	28	45	2
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Main St & Maltman Dr/Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB	
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR	
Maximum Queue (ft)	32	46	50	77	15	69	53	32	85	55	
Average Queue (ft)	7	16	17	26	1	27	17	7	35	15	
95th Queue (ft)	28	38	41	57	10	59	42	27	66	40	
Link Distance (ft)	777	160	160	160		1486				1622	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)					115			115	360	360	
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB	
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R	
Maximum Queue (ft)	59	86	77	64	105	31	29	116	138	59	55	
Average Queue (ft)	10	23	30	12	26	4	8	33	74	14	24	
95th Queue (ft)	38	63	62	44	75	20	28	83	125	43	50	
Link Distance (ft)	160	160		103	103		1666			1351		
Upstream Blk Time (%)			0	0	0							
Queuing Penalty (veh)			0	0	0							
Storage Bay Dist (ft)			140				100	240	240			
Storage Blk Time (%)			0	0								
Queuing Penalty (veh)			0	0								

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	46	35	28	37	187	130	29
Average Queue (ft)	6	5	2	3	94	57	1
95th Queue (ft)	26	22	14	19	159	98	12
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					2	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	50	57	66	97	57	51	79	115	30	72	45	46
Average Queue (ft)	16	29	21	39	19	19	31	51	4	26	14	14
95th Queue (ft)	43	55	56	77	47	44	67	97	18	53	35	41
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	33
Average Queue (ft)	6
95th Queue (ft)	26
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	75	115	44	68	79	78	144	51
Average Queue (ft)	27	43	14	26	28	23	62	20
95th Queue (ft)	60	84	37	53	58	57	113	43
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	103	50	100	85	91	58	63
Average Queue (ft)	34	18	42	29	23	23	27
95th Queue (ft)	73	40	80	67	66	52	50
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Zone Summary

Zone wide Queuing Penalty: 1
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# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project 0630-0730 AM  
 To Centennial  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	16	3.0	0.089	4.7	LOS A	0.4	9.3	0.45	0.34	0.45	34.9
8	T1	22	3.0	0.089	4.7	LOS A	0.4	9.3	0.45	0.34	0.45	34.8
18	R2	45	3.0	0.089	4.7	LOS A	0.4	9.3	0.45	0.34	0.45	33.8
Approach		83	3.0	0.089	4.7	LOS A	0.4	9.3	0.45	0.34	0.45	34.2
East: Idaho Maryland Rd												
1	L2	148	3.0	0.128	4.2	LOS A	0.5	13.4	0.32	0.19	0.32	32.9
6	T1	62	3.0	0.156	4.5	LOS A	0.7	16.8	0.33	0.20	0.33	35.4
16	R2	118	3.0	0.156	4.5	LOS A	0.7	16.8	0.33	0.20	0.33	34.3
Approach		329	3.0	0.156	4.3	LOS A	0.7	16.8	0.32	0.20	0.32	33.8
North: Main St												
7	L2	70	3.0	0.197	5.0	LOS A	0.8	20.6	0.35	0.24	0.35	34.4
4	T1	153	3.0	0.197	5.0	LOS A	0.8	20.6	0.35	0.24	0.35	34.3
14	R2	77	3.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		300	3.0	0.197	3.7	LOS A	0.8	20.6	0.26	0.18	0.26	35.0
West: Main St												
5	L2	148	3.0	0.295	6.6	LOS A	1.3	32.2	0.49	0.42	0.49	33.0
2	T1	122	3.0	0.295	6.6	LOS A	1.3	32.2	0.49	0.42	0.49	33.0
12	R2	23	3.0	0.295	6.6	LOS A	1.3	32.2	0.49	0.42	0.49	32.1
Approach		294	3.0	0.295	6.6	LOS A	1.3	32.2	0.49	0.42	0.49	32.9
All Vehicles		1005	3.0	0.295	4.8	LOS A	1.3	32.2	0.36	0.27	0.36	33.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	47	329	3	0	0	0	0	96	155	164	304	0
Future Vol, veh/h	47	329	3	0	0	0	0	96	155	164	304	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	52	366	3	0	0	0	0	107	172	182	338	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.1	14.8	16.2
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	22%	0%	100%	0%
Vol Thru, %	38%	78%	98%	0%	100%
Vol Right, %	62%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	251	212	168	164	304
LT Vol	0	47	0	164	0
Through Vol	96	165	165	0	304
RT Vol	155	0	3	0	0
Lane Flow Rate	279	235	186	182	338
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.479	0.445	0.346	0.344	0.591
Departure Headway (Hd)	6.184	6.822	6.697	6.805	6.297
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	583	526	536	528	571
Service Time	4.234	4.574	4.449	4.557	4.049
HCM Lane V/C Ratio	0.479	0.447	0.347	0.345	0.592
HCM Control Delay	14.8	15	13	13.1	17.8
HCM Lane LOS	B	B	B	B	C
HCM 95th-tile Q	2.6	2.3	1.5	1.5	3.8

**Intersection**

Intersection Delay, s/veh 23.7

Intersection LOS C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	288	61	57	644	203	224
Future Vol, veh/h	288	61	57	644	203	224
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	306	65	61	685	216	238
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	22.9	28.7	16
HCM LOS	C	D	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	21%	0%
Vol Thru, %	0%	0%	83%	79%	100%
Vol Right, %	0%	100%	17%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	203	224	349	272	429
LT Vol	203	0	0	57	0
Through Vol	0	0	288	215	429
RT Vol	0	224	61	0	0
Lane Flow Rate	216	238	371	289	457
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.472	0.44	0.683	0.543	0.844
Departure Headway (Hd)	7.875	6.647	6.618	6.76	6.653
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	456	539	546	532	544
Service Time	5.647	4.418	4.683	4.533	4.426
HCM Lane V/C Ratio	0.474	0.442	0.679	0.543	0.84
HCM Control Delay	17.6	14.6	22.9	17.4	35.9
HCM Lane LOS	C	B	C	C	E
HCM 95th-tile Q	2.5	2.2	5.2	3.2	8.8

**Intersection**

Intersection Delay, s/veh	17
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	390	88	31	545	107	49
Future Vol, veh/h	390	88	31	545	107	49
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	480	108	38	671	132	60
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.6	20.1	13
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	69%	0%	0%	15%	0%
Vol Thru, %	0%	100%	60%	85%	100%
Vol Right, %	31%	0%	40%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	260	218	213	363
LT Vol	107	0	0	31	0
Through Vol	0	260	130	182	363
RT Vol	49	0	88	0	0
Lane Flow Rate	192	320	268	262	447
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.347	0.545	0.435	0.439	0.741
Departure Headway (Hd)	6.505	6.128	5.841	6.042	5.968
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	553	589	614	594	604
Service Time	4.548	3.876	3.589	3.787	3.713
HCM Lane V/C Ratio	0.347	0.543	0.436	0.441	0.74
HCM Control Delay	13	16	13	13.5	23.9
HCM Lane LOS	B	C	B	B	C
HCM 95th-tile Q	1.5	3.3	2.2	2.2	6.4

Intersection												
Int Delay, s/veh	8.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻	↻	↻	↻		↻	↻	↻
Traffic Vol, veh/h	0	0	200	27	0	49	211	470	50	86	426	13
Future Vol, veh/h	0	0	200	27	0	49	211	470	50	86	426	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	213	29	0	52	224	500	53	91	453	14

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	1636	453	1724	1624	527	467	0	0	553	0	0
Stage 1	-	635	-	975	975	-	-	-	-	-	-	-
Stage 2	-	1001	-	749	649	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	101	607	70	102	551	1094	-	-	1017	-	-
Stage 1	0	472	-	303	330	-	-	-	-	-	-	-
Stage 2	0	321	-	404	466	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	73	607	36	74	551	1094	-	-	1017	-	-
Mov Cap-2 Maneuver	-	73	-	36	74	-	-	-	-	-	-	-
Stage 1	-	430	-	241	262	-	-	-	-	-	-	-
Stage 2	-	255	-	239	425	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.1		98.2		2.6		1.5	
HCM LOS	B		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	607	36	551	1017	-	-
HCM Lane V/C Ratio	0.205	-	-	0.351	0.798	0.095	0.09	-	-
HCM Control Delay (s)	9.1	-	-	14.1	254.4	12.2	8.9	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	1.6	2.9	0.3	0.3	-	-

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘	↗	↘	↑	↑↑	
Traffic Vol, veh/h	68	79	49	666	610	34
Future Vol, veh/h	68	79	49	666	610	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	70	81	51	687	629	35

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1436	332	664	0	-	0
Stage 1	647	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	135	665	923	-	-	-
Stage 1	484	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	128	665	923	-	-	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	457	-	-	-	-	-
Stage 2	446	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	923	-	326	665	-	-
HCM Lane V/C Ratio	0.055	-	0.215	0.122	-	-
HCM Control Delay (s)	9.1	-	19	11.2	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.8	0.4	-	-

Intersection	
Intersection Delay, s/veh	20.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	33	33	10	17	25	85	12	358	24	127	440	26
Future Vol, veh/h	33	33	10	17	25	85	12	358	24	127	440	26
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	35	11	18	27	90	13	381	26	135	468	28
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11.3	11.5	20.6	23.9
HCM LOS	B	B	C	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	43%	13%	100%	0%
Vol Thru, %	0%	94%	43%	20%	0%	94%
Vol Right, %	0%	6%	13%	67%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	382	76	127	127	466
LT Vol	12	0	33	17	127	0
Through Vol	0	358	33	25	0	440
RT Vol	0	24	10	85	0	26
Lane Flow Rate	13	406	81	135	135	496
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.023	0.682	0.156	0.239	0.237	0.796
Departure Headway (Hd)	6.592	6.04	6.924	6.367	6.327	5.78
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	541	597	514	559	566	625
Service Time	4.357	3.805	5.018	4.453	4.084	3.537
HCM Lane V/C Ratio	0.024	0.68	0.158	0.242	0.239	0.794
HCM Control Delay	9.5	20.9	11.3	11.5	11.1	27.4
HCM Lane LOS	A	C	B	B	B	D
HCM 95th-tile Q	0.1	5.3	0.5	0.9	0.9	7.8

Intersection						
Int Delay, s/veh	19.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	81	205	186	276	337	108
Future Vol, veh/h	81	205	186	276	337	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	225	204	303	370	119

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	204	0	-	0	607 204
Stage 1	-	-	-	-	204 -
Stage 2	-	-	-	-	403 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1368	-	-	0	460 837
Stage 1	-	-	-	0	830 -
Stage 2	-	-	-	0	675 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1368	-	-	-	430 837
Mov Cap-2 Maneuver	-	-	-	-	430 -
Stage 1	-	-	-	-	776 -
Stage 2	-	-	-	-	675 -

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	38.1
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1368	-	-	430	837
HCM Lane V/C Ratio	0.065	-	-	0.861	0.142
HCM Control Delay (s)	7.8	-	-	47.1	10
HCM Lane LOS	A	-	-	E	B
HCM 95th %tile Q(veh)	0.2	-	-	8.6	0.5

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	9	1	362	457	10
Future Vol, veh/h	32	9	1	362	457	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	9	1	381	481	11

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	870	487	492	0	-	0
Stage 1	487	-	-	-	-	-
Stage 2	383	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	322	581	1071	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	689	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	322	581	1071	-	-	-
Mov Cap-2 Maneuver	512	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1071	-	526	-	-
HCM Lane V/C Ratio	0.001	-	0.082	-	-
HCM Control Delay (s)	8.4	-	12.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-



Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	66	0	0	63	0	10
Future Vol, veh/h	66	0	0	63	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	0	0	68	0	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	72	0	140
Stage 1	-	-	-	-	72
Stage 2	-	-	-	-	68
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1528	-	853
Stage 1	-	-	-	-	951
Stage 2	-	-	-	-	955
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1528	-	853
Mov Cap-2 Maneuver	-	-	-	-	853
Stage 1	-	-	-	-	951
Stage 2	-	-	-	-	955

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	990	-	-	1528	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	104	0	8	174	0	0	0	12	0	0	0
Future Vol, veh/h	5	104	0	8	174	0	0	0	12	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	137	0	11	229	0	0	0	16	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	229	0	0	137	0	0	428	428	137	436	428	229
Stage 1	-	-	-	-	-	-	177	177	-	251	251	-
Stage 2	-	-	-	-	-	-	251	251	-	185	177	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1339	-	-	1447	-	-	537	519	911	531	519	810
Stage 1	-	-	-	-	-	-	825	753	-	753	699	-
Stage 2	-	-	-	-	-	-	753	699	-	817	753	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1339	-	-	1447	-	-	527	506	911	512	506	810
Mov Cap-2 Maneuver	-	-	-	-	-	-	527	506	-	512	506	-
Stage 1	-	-	-	-	-	-	812	741	-	741	693	-
Stage 2	-	-	-	-	-	-	746	693	-	790	741	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			0.3			9			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	911	1339	-	-	1447	-	-	-
HCM Lane V/C Ratio	0.017	0.015	-	-	0.007	-	-	-
HCM Control Delay (s)	9	7.7	0	-	7.5	0	-	0
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	28.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	303	120	12	400	245	37
Future Vol, veh/h	303	120	12	400	245	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	379	150	15	500	306	46

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	529	0	909 379
Stage 1	-	-	-	-	379 -
Stage 2	-	-	-	-	530 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1038	-	~ 305 668
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	590 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1038	-	~ 301 668
Mov Cap-2 Maneuver	-	-	-	-	~ 301 -
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	582 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	112.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	324	-	-	1038	-
HCM Lane V/C Ratio	1.088	-	-	0.014	-
HCM Control Delay (s)	112.3	-	-	8.5	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	13.4	-	-	0	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	14.3
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	212	115	214	70	107	208
Future Vol, veh/h	212	115	214	70	107	208
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	249	135	252	82	126	245
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	16.8	13.9	12
HCM LOS	C	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	65%	0%	100%	0%
Vol Thru, %	35%	75%	0%	0%
Vol Right, %	0%	25%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	327	284	107	208
LT Vol	212	0	107	0
Through Vol	115	214	0	0
RT Vol	0	70	0	208
Lane Flow Rate	385	334	126	245
Geometry Grp	2	2	7	7
Degree of Util (X)	0.6	0.504	0.243	0.39
Departure Headway (Hd)	5.615	5.434	6.958	5.738
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	642	662	516	626
Service Time	3.657	3.479	4.703	3.482
HCM Lane V/C Ratio	0.6	0.505	0.244	0.391
HCM Control Delay	16.8	13.9	11.9	12.1
HCM Lane LOS	C	B	B	B
HCM 95th-tile Q	4	2.8	0.9	1.8

**Intersection**

Intersection Delay, s/veh 15.7  
 Intersection LOS C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	144	186	127	172	179	179
Future Vol, veh/h	144	186	127	172	179	179
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	224	153	207	216	216
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	17.9	17.5	12.1
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	42%	44%	0%	0%
Vol Thru, %	58%	0%	100%	0%
Vol Right, %	0%	56%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	299	330	179	179
LT Vol	127	144	0	0
Through Vol	172	0	179	0
RT Vol	0	186	0	179
Lane Flow Rate	360	398	216	216
Geometry Grp	5	2	7	7
Degree of Util (X)	0.596	0.627	0.378	0.335
Departure Headway (Hd)	5.954	5.68	6.307	5.594
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	632	569	641
Service Time	4.014	3.739	4.071	3.358
HCM Lane V/C Ratio	0.595	0.63	0.38	0.337
HCM Control Delay	17.5	17.9	12.9	11.2
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	3.9	4.4	1.8	1.5

Queues  
24: Brunswick Rd & Loma Rica Dr















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	192	342	454	82	180	470
v/c Ratio	0.59	0.40	0.75	0.14	0.52	0.42
Control Delay	33.8	5.7	27.2	4.9	29.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	5.7	27.2	4.9	29.7	6.9
Queue Length 50th (ft)	64	22	144	0	60	76
Queue Length 95th (ft)	#160	81	284	26	135	129
Internal Link Dist (ft)	1033		859			663
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	419	1038	945	842	591	1588
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.33	0.48	0.10	0.30	0.30

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project 1530  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	177	315	418	75	166	432
Future Volume (veh/h)	177	315	418	75	166	432
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	192	342	454	82	180	470
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	404	568	579	491	235	1012
Arrive On Green	0.23	0.23	0.32	0.32	0.13	0.55
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	192	342	454	82	180	470
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	4.8	9.0	11.3	1.9	5.0	7.7
Cycle Q Clear(g_c), s	4.8	9.0	11.3	1.9	5.0	7.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	404	568	579	491	235	1012
V/C Ratio(X)	0.48	0.60	0.78	0.17	0.77	0.46
Avail Cap(c_a), veh/h	490	645	1101	933	691	1794
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	12.9	15.5	12.3	20.9	6.7
Incr Delay (d2), s/veh	0.9	1.3	2.4	0.2	5.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.8	4.0	0.5	2.0	1.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.5	14.1	17.9	12.5	26.1	7.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	534		536			650
Approach Delay, s/veh	15.3		17.1			12.3
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.9	21.7			33.5	16.5
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	7.0	13.3			9.7	11.0
Green Ext Time (p_c), s	0.4	2.6			2.9	0.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.7			
HCM 6th LOS			B			





1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	7.9	14.3	5.1	8.2

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	1.1	0.0	0.5
Total Del/Veh (s)	5.7	8.1	12.6	8.7

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.4	0.2
Total Del/Veh (s)	9.6	9.1	1.6	6.3

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.1
Total Del/Veh (s)	17.6	9.3	16.7	15.9	13.4

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.7
Total Del/Veh (s)	14.3	13.7	20.1	36.1	19.8

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.6	9.2	26.7	13.6

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.4
Total Del/Veh (s)	16.4	32.5	27.9	11.6	22.0

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	2.6	0.9
Total Del/Veh (s)	13.9	14.7	13.4	14.0

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.6	0.0	0.2	1.2
Total Del/Veh (s)	19.4	11.6	16.1	15.9

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Total Zone Performance

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Denied Del/Veh (s)	1.4
Total Del/Veh (s)	675.1

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	104	148	94	86
Average Queue (ft)	62	72	43	39
95th Queue (ft)	103	126	77	73
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	3			
Queuing Penalty (veh)	8			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	125	117	159	116	108
Average Queue (ft)	68	33	65	62	50
95th Queue (ft)	109	78	117	103	90
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			1	1
Queuing Penalty (veh)	0			2	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	1		
Queuing Penalty (veh)		0	2		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	143	136	39	72	34
Average Queue (ft)	70	56	17	35	4
95th Queue (ft)	115	98	42	56	20
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	45	105	109	162	22	207	137	186	201	125
Average Queue (ft)	13	46	47	80	1	90	61	61	107	57
95th Queue (ft)	39	87	88	148	11	157	114	136	173	107
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)				0						
Queuing Penalty (veh)				1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						3	1			
Queuing Penalty (veh)						6	1			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	181	191	102	173	180	96	156	199	214	85	100
Average Queue (ft)	94	130	65	64	97	34	75	102	135	27	46
95th Queue (ft)	181	207	103	145	177	77	131	180	197	65	79
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	6	1	3	6						
Queuing Penalty (veh)	3	19	0	12	24						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	3		1	4	0	0		
Queuing Penalty (veh)			4	4		1	1	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	154	157	208	254	101	217	233	341
Average Queue (ft)	55	58	56	72	4	145	167	77
95th Queue (ft)	122	123	146	177	60	221	250	264
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)			0	0		13	22	
Queuing Penalty (veh)			0	0		0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	126	140	189	196	195	164	249	351	233	286	200	134
Average Queue (ft)	61	80	97	108	90	77	116	195	86	158	83	60
95th Queue (ft)	108	122	161	169	155	137	202	299	189	247	160	110
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)			0	0	0	2	5		0	0		
Queuing Penalty (veh)			0	0	0	7	7		0	1		

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	112	16
Average Queue (ft)	50	0
95th Queue (ft)	94	14
Link Distance (ft)	229	229
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	175	221	140	153	173	96	133	127
Average Queue (ft)	84	102	59	53	72	40	59	53
95th Queue (ft)	150	195	116	110	136	79	108	96
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	0	3						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			0	0				0
Queuing Penalty (veh)			0	0				0

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	446	179	209	125	116	207	77
Average Queue (ft)	180	107	109	40	38	96	34
95th Queue (ft)	377	205	183	94	89	165	60
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)	1		0	0			
Queuing Penalty (veh)	0		1	0			
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	10	1					
Queuing Penalty (veh)	37	5					

Zone Summary

Zone wide Queuing Penalty: 153

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project 1530-1630 PM  
 To Centennial  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	59	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.7
8	T1	54	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.6
18	R2	86	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	32.7
Approach		200	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.2
East: Idaho Maryland Rd												
1	L2	343	3.0	0.331	6.9	LOS A	1.6	40.4	0.49	0.40	0.49	31.7
6	T1	214	3.0	0.406	7.8	LOS A	2.1	53.3	0.53	0.43	0.53	33.6
16	R2	208	3.0	0.406	7.8	LOS A	2.1	53.3	0.53	0.43	0.53	32.6
Approach		765	3.0	0.406	7.4	LOS A	2.1	53.3	0.51	0.42	0.51	32.5
North: Main St												
7	L2	92	3.0	0.400	9.4	LOS A	2.0	50.6	0.63	0.68	0.77	32.3
4	T1	230	3.0	0.400	9.4	LOS A	2.0	50.6	0.63	0.68	0.77	32.2
14	R2	310	3.0	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		632	3.0	0.400	4.8	LOS A	2.0	50.6	0.32	0.35	0.39	34.5
West: Main St												
5	L2	194	3.0	0.437	10.4	LOS B	2.3	59.5	0.66	0.74	0.89	31.1
2	T1	102	3.0	0.437	10.4	LOS B	2.3	59.5	0.66	0.74	0.89	31.1
12	R2	41	3.0	0.437	10.4	LOS B	2.3	59.5	0.66	0.74	0.89	30.3
Approach		336	3.0	0.437	10.4	LOS B	2.3	59.5	0.66	0.74	0.89	31.0
All Vehicles		1933	3.0	0.437	7.0	LOS A	2.3	59.5	0.48	0.45	0.54	32.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\16-20 EPAPPP Centennial\4.4 EPAPPP 1530 PM Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	28	181	5	0	0	0	0	62	62	115	200	0
Future Vol, veh/h	28	181	5	0	0	0	0	62	62	115	200	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	201	6	0	0	0	0	69	69	128	222	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10	9.7	10.5
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	24%	0%	100%	0%
Vol Thru, %	50%	76%	95%	0%	100%
Vol Right, %	50%	0%	5%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	124	119	96	115	200
LT Vol	0	28	0	115	0
Through Vol	62	91	91	0	200
RT Vol	62	0	5	0	0
Lane Flow Rate	138	132	106	128	222
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.203	0.215	0.168	0.207	0.329
Departure Headway (Hd)	5.304	5.866	5.71	5.839	5.335
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	672	608	624	612	671
Service Time	3.376	3.638	3.482	3.603	3.1
HCM Lane V/C Ratio	0.205	0.217	0.17	0.209	0.331
HCM Control Delay	9.7	10.3	9.6	10.1	10.7
HCM Lane LOS	A	B	A	B	B
HCM 95th-tile Q	0.8	0.8	0.6	0.8	1.4



<b>Intersection</b>						
Intersection Delay, s/veh	10.3					
Intersection LOS	B					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	111	35	21	295	82	122
Future Vol, veh/h	111	35	21	295	82	122
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	134	42	25	355	99	147
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	10.2	10.6	9.8
HCM LOS	B	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	18%	0%
Vol Thru, %	0%	0%	76%	82%	100%
Vol Right, %	0%	100%	24%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	82	122	146	119	197
LT Vol	82	0	0	21	0
Through Vol	0	0	111	98	197
RT Vol	0	122	35	0	0
Lane Flow Rate	99	147	176	144	237
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.175	0.211	0.258	0.218	0.354
Departure Headway (Hd)	6.384	5.173	5.285	5.465	5.377
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	558	688	674	653	663
Service Time	4.165	2.953	3.363	3.236	3.148
HCM Lane V/C Ratio	0.177	0.214	0.261	0.221	0.357
HCM Control Delay	10.5	9.4	10.2	9.8	11.1
HCM Lane LOS	B	A	B	A	B
HCM 95th-tile Q	0.6	0.8	1	0.8	1.6

Intersection	
Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Vol, veh/h	216	8	2	266	27	12
Future Vol, veh/h	216	8	2	266	27	12
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	253	9	2	311	32	14
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	8.8	9.1	8.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	69%	0%	0%	2%	0%
Vol Thru, %	0%	100%	90%	98%	100%
Vol Right, %	31%	0%	10%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	144	80	91	177
LT Vol	27	0	0	2	0
Through Vol	0	144	72	89	177
RT Vol	12	0	8	0	0
Lane Flow Rate	46	169	94	106	208
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.065	0.23	0.126	0.144	0.281
Departure Headway (Hd)	5.14	4.913	4.843	4.88	4.869
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	697	733	743	737	741
Service Time	3.168	2.63	2.559	2.595	2.584
HCM Lane V/C Ratio	0.066	0.231	0.127	0.144	0.281
HCM Control Delay	8.5	9.1	8.3	8.4	9.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.9	0.4	0.5	1.2

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	0	0	139	22	0	36	104	206	26	63	276	1
Future Vol, veh/h	0	0	139	22	0	36	104	206	26	63	276	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	154	24	0	40	116	229	29	70	307	1

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	937	307	1001	924	244	308	0	0	258	0	0
Stage 1	-	447	-	476	476	-	-	-	-	-	-	-
Stage 2	-	490	-	525	448	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	265	733	222	269	795	1253	-	-	1307	-	-
Stage 1	0	573	-	570	557	-	-	-	-	-	-	-
Stage 2	0	549	-	536	573	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	227	733	156	231	795	1253	-	-	1307	-	-
Mov Cap-2 Maneuver	-	227	-	156	231	-	-	-	-	-	-	-
Stage 1	-	542	-	517	505	-	-	-	-	-	-	-
Stage 2	-	498	-	400	542	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.2		18.3		2.5		1.5	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1253	-	-	733	156	795	1307	-	-
HCM Lane V/C Ratio	0.092	-	-	0.211	0.157	0.05	0.054	-	-
HCM Control Delay (s)	8.2	-	-	11.2	32.3	9.8	7.9	-	-
HCM Lane LOS	A	-	-	B	D	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	0.5	0.2	0.2	-	-

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	19	41	16	313	432	13
Future Vol, veh/h	19	41	16	313	432	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	48	19	364	502	15

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	912	259	517	0	-	0
Stage 1	510	-	-	-	-	-
Stage 2	402	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	288	741	1047	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	675	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	283	741	1047	-	-	-
Mov Cap-2 Maneuver	472	-	-	-	-	-
Stage 1	559	-	-	-	-	-
Stage 2	675	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1047	-	472	741	-	-
HCM Lane V/C Ratio	0.018	-	0.047	0.064	-	-
HCM Control Delay (s)	8.5	-	13	10.2	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	22	26	10	11	17	43	11	220	12	89	328	17
Future Vol, veh/h	22	26	10	11	17	43	11	220	12	89	328	17
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	30	11	13	20	49	13	253	14	102	377	20
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.7	9.4	11.7	13.7
HCM LOS	A	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	38%	15%	100%	0%
Vol Thru, %	0%	95%	45%	24%	0%	95%
Vol Right, %	0%	5%	17%	61%	0%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	232	58	71	89	345
LT Vol	11	0	22	11	89	0
Through Vol	0	220	26	17	0	328
RT Vol	0	12	10	43	0	17
Lane Flow Rate	13	267	67	82	102	397
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.021	0.4	0.11	0.127	0.162	0.57
Departure Headway (Hd)	6.041	5.4	5.952	5.616	5.71	5.172
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	596	659	605	642	622	690
Service Time	3.741	3.199	3.955	3.619	3.498	2.959
HCM Lane V/C Ratio	0.022	0.405	0.111	0.128	0.164	0.575
HCM Control Delay	8.9	11.8	9.7	9.4	9.6	14.7
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0.1	1.9	0.4	0.4	0.6	3.6

Intersection						
Int Delay, s/veh	7.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	27	134	79	171	239	47
Future Vol, veh/h	27	134	79	171	239	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	151	89	192	269	53
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	89	0	-	0	300	89
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	211	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1506	-	-	0	691	969
Stage 1	-	-	-	0	934	-
Stage 2	-	-	-	0	824	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1506	-	-	-	677	969
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	824	-
Approach	EB	WB	SB			
HCM Control Delay, s	1.2	0	13			
HCM LOS			B			
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2	
Capacity (veh/h)	1506	-	-	677	969	
HCM Lane V/C Ratio	0.02	-	-	0.397	0.054	
HCM Control Delay (s)	7.4	-	-	13.8	8.9	
HCM Lane LOS	A	-	-	B	A	
HCM 95th %tile Q(veh)	0.1	-	-	1.9	0.2	

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	14	14	189	285	64
Future Vol, veh/h	54	14	14	189	285	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	16	16	220	331	74

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	620	368	405	0	-	0
Stage 1	368	-	-	-	-	-
Stage 2	252	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	452	677	1154	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	446	677	1154	-	-	-
Mov Cap-2 Maneuver	602	-	-	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	790	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1154	-	616	-	-
HCM Lane V/C Ratio	0.014	-	0.128	-	-
HCM Control Delay (s)	8.2	-	11.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	0	0	45	0	10
Future Vol, veh/h	48	0	0	45	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	0	0	49	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	52	0	101 52
Stage 1	-	-	-	-	52 -
Stage 2	-	-	-	-	49 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1554	-	898 1016
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	973 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1554	-	898 1016
Mov Cap-2 Maneuver	-	-	-	-	898 -
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	973 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1016	-	-	1554	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-



Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	56	0	8	55	0	0	0	12	0	0	0
Future Vol, veh/h	0	56	0	8	55	0	0	0	12	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	72	0	10	71	0	0	0	15	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	71	0	0	72	0	0	163	163	72	171	163	71
Stage 1	-	-	-	-	-	-	72	72	-	91	91	-
Stage 2	-	-	-	-	-	-	91	91	-	80	72	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1529	-	-	1528	-	-	802	729	990	792	729	991
Stage 1	-	-	-	-	-	-	938	835	-	916	820	-
Stage 2	-	-	-	-	-	-	916	820	-	929	835	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1529	-	-	1528	-	-	798	724	990	775	724	991
Mov Cap-2 Maneuver	-	-	-	-	-	-	798	724	-	775	724	-
Stage 1	-	-	-	-	-	-	938	835	-	916	814	-
Stage 2	-	-	-	-	-	-	910	814	-	915	835	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.9			8.7			0		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	990	1529	-	-	1528	-	-	-
HCM Lane V/C Ratio	0.016	-	-	-	0.007	-	-	-
HCM Control Delay (s)	8.7	0	-	-	7.4	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	122	34	3	122	35	11
Future Vol, veh/h	122	34	3	122	35	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	172	48	4	172	49	15

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	220	0	352 172
Stage 1	-	-	-	-	172 -
Stage 2	-	-	-	-	180 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1349	-	646 872
Stage 1	-	-	-	-	858 -
Stage 2	-	-	-	-	851 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1349	-	644 872
Mov Cap-2 Maneuver	-	-	-	-	644 -
Stage 1	-	-	-	-	858 -
Stage 2	-	-	-	-	848 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	687	-	-	1349	-
HCM Lane V/C Ratio	0.094	-	-	0.003	-
HCM Control Delay (s)	10.8	-	-	7.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	↔
Traffic Vol, veh/h	68	58	52	25	29	66
Future Vol, veh/h	68	58	52	25	29	66
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	88	79	38	44	100
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	9	8	8.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	54%	0%	100%	0%
Vol Thru, %	46%	68%	0%	0%
Vol Right, %	0%	32%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	77	29	66
LT Vol	68	0	29	0
Through Vol	58	52	0	0
RT Vol	0	25	0	66
Lane Flow Rate	191	117	44	100
Geometry Grp	2	2	7	7
Degree of Util (X)	0.24	0.139	0.07	0.126
Departure Headway (Hd)	4.517	4.303	5.734	4.527
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	796	834	626	793
Service Time	2.535	2.323	3.458	2.251
HCM Lane V/C Ratio	0.24	0.14	0.07	0.126
HCM Control Delay	9	8	8.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.5	0.2	0.4

**Intersection**







Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	86	135	47	62	50	64
Future Vol, veh/h	86	135	47	62	50	64
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	115	180	63	83	67	85
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right		NB	EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.8	9.3	8.3
HCM LOS	A	A	A













Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	43%	39%	0%	0%
Vol Thru, %	57%	0%	100%	0%
Vol Right, %	0%	61%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	109	221	50	64
LT Vol	47	86	0	0
Through Vol	62	0	50	0
RT Vol	0	135	0	64
Lane Flow Rate	145	295	67	85
Geometry Grp	5	2	7	7
Degree of Util (X)	0.201	0.357	0.099	0.11
Departure Headway (Hd)	4.978	4.358	5.355	4.649
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	718	825	667	768
Service Time	3.025	2.389	3.103	2.397
HCM Lane V/C Ratio	0.202	0.358	0.1	0.111
HCM Control Delay	9.3	9.8	8.7	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	1.6	0.3	0.4

Queues  
24: Brunswick Rd & Loma Rica Dr

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	54	296	25	111	439
v/c Ratio	0.10	0.08	0.38	0.04	0.22	0.30
Control Delay	17.9	3.3	12.9	6.2	16.3	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	3.3	12.9	6.2	16.3	3.4
Queue Length 50th (ft)	6	0	33	0	14	0
Queue Length 95th (ft)	38	14	137	13	68	95
Internal Link Dist (ft)	1021		867			623
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	869	1141	1493	1273	1085	1804
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.05	0.20	0.02	0.10	0.24
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project 1830  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	50	272	23	102	404
Future Volume (veh/h)	42	50	272	23	102	404
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	46	54	296	25	111	439
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	165	303	493	418	176	992
Arrive On Green	0.09	0.09	0.27	0.27	0.10	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	46	54	296	25	111	439
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.7	0.9	4.2	0.4	1.8	4.3
Cycle Q Clear(g_c), s	0.7	0.9	4.2	0.4	1.8	4.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	165	303	493	418	176	992
V/C Ratio(X)	0.28	0.18	0.60	0.06	0.63	0.44
Avail Cap(c_a), veh/h	829	894	1864	1580	1170	3037
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	9.9	9.4	8.0	12.8	4.1
Incr Delay (d2), s/veh	0.9	0.3	1.2	0.1	3.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	1.0	0.1	0.6	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.4	10.2	10.6	8.1	16.5	4.4
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	100		321			550
Approach Delay, s/veh	11.6		10.4			6.8
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.1	13.8			21.9	7.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	3.8	6.2			6.3	2.9
Green Ext Time (p_c), s	0.2	1.6			2.7	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.5			
HCM 6th LOS			A			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	6.6	11.6	4.7	7.1

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	1.2	0.0	0.5
Total Del/Veh (s)	5.2	6.6	10.4	7.0

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.2
Total Del/Veh (s)	6.3	7.8	0.9	4.0

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.4	2.1	1.1
Total Del/Veh (s)	17.3	6.5	10.7	10.1	9.0

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.7
Total Del/Veh (s)	8.9	13.4	13.7	35.8	16.9

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	4.6	23.0	8.9

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.6	0.0	0.4
Total Del/Veh (s)	8.6	14.7	12.7	3.2	9.2

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	2.7	1.1
Total Del/Veh (s)	10.0	9.2	5.8	8.3



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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.7	0.0	0.1	0.6
Total Del/Veh (s)	6.7	7.4	8.6	7.4

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Total Zone Performance

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Denied Del/Veh (s)	1.2
Total Del/Veh (s)	191.3

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	103	109	75	70
Average Queue (ft)	58	49	29	27
95th Queue (ft)	99	92	60	56
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	5			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	114	63	83	91	75
Average Queue (ft)	61	23	39	43	31
95th Queue (ft)	101	52	73	75	62
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	84	72	31	58	13
Average Queue (ft)	43	37	7	28	1
95th Queue (ft)	70	58	28	47	6
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	49	58	84	100	5	99	67	91	120	102
Average Queue (ft)	16	23	32	36	0	46	30	23	60	32
95th Queue (ft)	43	48	63	72	3	84	55	62	100	72
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)				0						
Queuing Penalty (veh)				0						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	124	165	100	139	133	73	98	123	151	62	72
Average Queue (ft)	35	68	54	34	46	22	48	39	84	16	31
95th Queue (ft)	88	135	96	101	107	54	82	91	135	47	55
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	1	1						
Queuing Penalty (veh)	0	0	0	3	2						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	1		0	0				
Queuing Penalty (veh)			2	1		0	0				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	64	62	35	54	199	129	43
Average Queue (ft)	11	17	4	7	109	55	2
95th Queue (ft)	39	47	19	30	177	96	22
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					4	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	54	73	89	89	103	76	81	128	82	135	103	72
Average Queue (ft)	17	34	37	50	49	34	39	57	22	65	38	23
95th Queue (ft)	46	64	76	82	82	64	71	103	56	112	76	57
Link Distance (ft)			334	334				1884	1884		1476	229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280			280
Storage Blk Time (%)	0											
Queuing Penalty (veh)	0											

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	68
Average Queue (ft)	26
95th Queue (ft)	58
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	83	118	55	56	64	48	74	63
Average Queue (ft)	32	44	22	22	23	18	28	28
95th Queue (ft)	66	95	48	47	48	44	60	51
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	93	57	99	60	62	83	57
Average Queue (ft)	38	21	42	22	14	37	25
95th Queue (ft)	75	44	82	53	44	68	48
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 14

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project 1830-1930 PM  
To Centennial  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	40	3.0	0.094	4.5	LOS A	0.4	10.0	0.43	0.30	0.43	34.2
8	T1	37	3.0	0.094	4.5	LOS A	0.4	10.0	0.43	0.30	0.43	34.2
18	R2	14	3.0	0.094	4.5	LOS A	0.4	10.0	0.43	0.30	0.43	33.2
Approach		92	3.0	0.094	4.5	LOS A	0.4	10.0	0.43	0.30	0.43	34.0
East: Idaho Maryland Rd												
1	L2	179	3.0	0.162	4.7	LOS A	0.7	17.3	0.37	0.25	0.37	32.6
6	T1	168	3.0	0.236	5.4	LOS A	1.1	27.0	0.40	0.28	0.40	34.9
16	R2	93	3.0	0.236	5.4	LOS A	1.1	27.0	0.40	0.28	0.40	33.8
Approach		439	3.0	0.236	5.1	LOS A	1.1	27.0	0.39	0.27	0.39	33.7
North: Main St												
7	L2	54	3.0	0.213	5.7	LOS A	0.8	21.6	0.46	0.39	0.46	34.2
4	T1	156	3.0	0.213	5.7	LOS A	0.8	21.6	0.46	0.39	0.46	34.1
14	R2	210	3.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		419	3.0	0.213	2.9	LOS A	0.8	21.6	0.23	0.19	0.23	35.6
West: Main St												
5	L2	160	3.0	0.273	6.4	LOS A	1.1	29.1	0.48	0.42	0.48	32.9
2	T1	85	3.0	0.273	6.4	LOS A	1.1	29.1	0.48	0.42	0.48	32.8
12	R2	24	3.0	0.273	6.4	LOS A	1.1	29.1	0.48	0.42	0.48	31.9
Approach		268	3.0	0.273	6.4	LOS A	1.1	29.1	0.48	0.42	0.48	32.8
All Vehicles		1218	3.0	0.273	4.6	LOS A	1.1	29.1	0.36	0.28	0.36	34.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection	
Intersection Delay, s/veh	20
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	57	313	8	0	0	0	0	177	249	146	244	0
Future Vol, veh/h	57	313	8	0	0	0	0	177	249	146	244	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	63	344	9	0	0	0	0	195	274	160	268	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.9	29.4	14.8
HCM LOS	B	D	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	27%	0%	100%	0%
Vol Thru, %	42%	73%	95%	0%	100%
Vol Right, %	58%	0%	5%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	426	214	165	146	244
LT Vol	0	57	0	146	0
Through Vol	177	157	157	0	244
RT Vol	249	0	8	0	0
Lane Flow Rate	468	235	181	160	268
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.799	0.465	0.35	0.318	0.493
Departure Headway (Hd)	6.141	7.135	6.964	7.125	6.615
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	585	502	515	502	542
Service Time	4.202	4.906	4.735	4.899	4.388
HCM Lane V/C Ratio	0.8	0.468	0.351	0.319	0.494
HCM Control Delay	29.4	16	13.5	13.2	15.7
HCM Lane LOS	D	C	B	B	C
HCM 95th-tile Q	7.8	2.4	1.6	1.4	2.7



Intersection	
Intersection Delay, s/veh	27.8
Intersection LOS	D

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	295	48	44	391	268	474
Future Vol, veh/h	295	48	44	391	268	474
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	317	52	47	420	288	510
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	26.1	18.1	34.2
HCM LOS	D	C	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	25%	0%
Vol Thru, %	0%	0%	86%	75%	100%
Vol Right, %	0%	100%	14%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	268	474	343	174	261
LT Vol	268	0	0	44	0
Through Vol	0	0	295	130	261
RT Vol	0	474	48	0	0
Lane Flow Rate	288	510	369	187	280
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.604	0.895	0.718	0.394	0.579
Departure Headway (Hd)	7.546	6.321	7.01	7.561	7.431
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	475	571	513	474	482
Service Time	5.325	4.099	5.082	5.348	5.218
HCM Lane V/C Ratio	0.606	0.893	0.719	0.395	0.581
HCM Control Delay	21.3	41.5	26.1	15.2	20
HCM Lane LOS	C	E	D	C	C
HCM 95th-tile Q	3.9	10.5	5.8	1.9	3.6

Intersection	
Intersection Delay, s/veh	14
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	624	122	22	352	82	30
Future Vol, veh/h	624	122	22	352	82	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	657	128	23	371	86	32
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.6	11.6	10.9
HCM LOS	C	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	73%	0%	0%	16%	0%
Vol Thru, %	0%	100%	63%	84%	100%
Vol Right, %	27%	0%	37%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	112	416	330	139	235
LT Vol	82	0	0	22	0
Through Vol	0	416	208	117	235
RT Vol	30	0	122	0	0
Lane Flow Rate	118	438	347	147	247
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.204	0.657	0.496	0.24	0.398
Departure Headway (Hd)	6.235	5.404	5.143	5.88	5.8
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	577	674	705	612	622
Service Time	4.262	3.104	2.843	3.606	3.526
HCM Lane V/C Ratio	0.205	0.65	0.492	0.24	0.397
HCM Control Delay	10.9	17.8	12.8	10.5	12.3
HCM Lane LOS	B	C	B	B	B
HCM 95th-tile Q	0.8	4.9	2.8	0.9	1.9

Intersection												
Int Delay, s/veh	25.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↗			↖	↗	↖	↗	↖	↖	↗	↖
Traffic Vol, veh/h	0	0	218	64	0	107	250	481	19	38	358	8
Future Vol, veh/h	0	0	218	64	0	107	250	481	19	38	358	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	232	68	0	114	266	512	20	40	381	9

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	1525	381	1636	1524	522	390	0	0	532	0	0
Stage 1	-	461	-	1054	1054	-	-	-	-	-	-	-
Stage 2	-	1064	-	582	470	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	118	666	81	118	555	1169	-	-	1036	-	-
Stage 1	0	565	-	273	303	-	-	-	-	-	-	-
Stage 2	0	300	-	499	560	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	88	666	~42	88	555	1169	-	-	1036	-	-
Mov Cap-2 Maneuver	-	88	-	~42	88	-	-	-	-	-	-	-
Stage 1	-	543	-	211	234	-	-	-	-	-	-	-
Stage 2	-	232	-	313	538	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	201.7	3	0.8
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1169	-	-	666	42	555	1036	-	-
HCM Lane V/C Ratio	0.228	-	-	0.348	1.621	0.205	0.039	-	-
HCM Control Delay (s)	9	-	-	13.3	516.9	13.2	8.6	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.9	-	-	1.6	6.9	0.8	0.1	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↗	
Traffic Vol, veh/h	22	45	69	732	528	94
Future Vol, veh/h	22	45	69	732	528	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	50	77	813	587	104

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1606	346	691	0	-	0
Stage 1	639	-	-	-	-	-
Stage 2	967	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	105	651	902	-	-	-
Stage 1	489	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	96	651	902	-	-	-
Mov Cap-2 Maneuver	284	-	-	-	-	-
Stage 1	447	-	-	-	-	-
Stage 2	368	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.6	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	902	-	284	651	-	-
HCM Lane V/C Ratio	0.085	-	0.086	0.077	-	-
HCM Control Delay (s)	9.4	-	18.9	11	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	0.2	-	-

Intersection	
Intersection Delay, s/veh	47.3
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	41	23	24	28	57	182	28	531	13	61	283	27
Future Vol, veh/h	41	23	24	28	57	182	28	531	13	61	283	27
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	44	25	26	30	61	196	30	571	14	66	304	29
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	13	17.4	84.6	19.4
HCM LOS	B	C	F	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	10%	100%	0%
Vol Thru, %	0%	98%	26%	21%	0%	91%
Vol Right, %	0%	2%	27%	68%	0%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	544	88	267	61	310
LT Vol	28	0	41	28	61	0
Through Vol	0	531	23	57	0	283
RT Vol	0	13	24	182	0	27
Lane Flow Rate	30	585	95	287	66	333
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.06	1.084	0.202	0.527	0.134	0.627
Departure Headway (Hd)	7.201	6.673	8.001	6.917	7.637	7.06
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	500	550	451	525	472	513
Service Time	4.905	4.377	6.001	4.917	5.337	4.76
HCM Lane V/C Ratio	0.06	1.064	0.211	0.547	0.14	0.649
HCM Control Delay	10.4	88.4	13	17.4	11.5	20.9
HCM Lane LOS	B	F	B	C	B	C
HCM 95th-tile Q	0.2	17.9	0.7	3	0.5	4.3

Intersection						
Int Delay, s/veh	7.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	118	160	263	405	160	105
Future Vol, veh/h	118	160	263	405	160	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	126	170	280	431	170	112

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	280	0	-	0	702 280
Stage 1	-	-	-	-	280 -
Stage 2	-	-	-	-	422 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1283	-	-	0	404 759
Stage 1	-	-	-	0	767 -
Stage 2	-	-	-	0	662 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1283	-	-	-	364 759
Mov Cap-2 Maneuver	-	-	-	-	364 -
Stage 1	-	-	-	-	692 -
Stage 2	-	-	-	-	662 -

Approach	EB	WB	SB
HCM Control Delay, s	3.4	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1283	-	-	364	759
HCM Lane V/C Ratio	0.098	-	-	0.468	0.147
HCM Control Delay (s)	8.1	-	-	23.3	10.6
HCM Lane LOS	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	2.4	0.5

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	15	22	517	240	95
Future Vol, veh/h	54	15	22	517	240	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	16	23	539	250	99

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	885	300	349	0	-	0
Stage 1	300	-	-	-	-	-
Stage 2	585	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	315	740	1210	-	-	-
Stage 1	752	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	309	740	1210	-	-	-
Mov Cap-2 Maneuver	488	-	-	-	-	-
Stage 1	738	-	-	-	-	-
Stage 2	557	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1210	-	527	-	-
HCM Lane V/C Ratio	0.019	-	0.136	-	-
HCM Control Delay (s)	8	-	12.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	78	0	0	112	0	10
Future Vol, veh/h	78	0	0	112	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	0	0	122	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	85	0	207 85
Stage 1	-	-	-	-	85 -
Stage 2	-	-	-	-	122 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1512	-	781 974
Stage 1	-	-	-	-	938 -
Stage 2	-	-	-	-	903 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1512	-	781 974
Mov Cap-2 Maneuver	-	-	-	-	781 -
Stage 1	-	-	-	-	938 -
Stage 2	-	-	-	-	903 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	974	-	-	1512	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-



Intersection						
Int Delay, s/veh	1.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	256	236	26	244	74	12
Future Vol, veh/h	256	236	26	244	74	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	264	243	27	252	76	12

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	507	0	570 264
Stage 1	-	-	-	-	264 -
Stage 2	-	-	-	-	306 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1058	-	483 775
Stage 1	-	-	-	-	780 -
Stage 2	-	-	-	-	747 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1058	-	470 775
Mov Cap-2 Maneuver	-	-	-	-	470 -
Stage 1	-	-	-	-	780 -
Stage 2	-	-	-	-	728 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	497	-	-	1058	-
HCM Lane V/C Ratio	0.178	-	-	0.025	-
HCM Control Delay (s)	13.8	-	-	8.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↗		↖	↗
Traffic Vol, veh/h	109	144	132	93	46	123
Future Vol, veh/h	109	144	132	93	46	123
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	169	155	109	54	145
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	11.1	9.9	9.4
HCM LOS	B	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	43%	0%	100%	0%
Vol Thru, %	57%	59%	0%	0%
Vol Right, %	0%	41%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	253	225	46	123
LT Vol	109	0	46	0
Through Vol	144	132	0	0
RT Vol	0	93	0	123
Lane Flow Rate	298	265	54	145
Geometry Grp	2	2	7	7
Degree of Util (X)	0.4	0.335	0.095	0.205
Departure Headway (Hd)	4.835	4.56	6.315	5.102
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	741	784	564	697
Service Time	2.889	2.614	4.091	2.877
HCM Lane V/C Ratio	0.402	0.338	0.096	0.208
HCM Control Delay	11.1	9.9	9.8	9.2
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.9	1.5	0.3	0.8

**Intersection**







Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	97	85	167	90	88	79
Future Vol, veh/h	97	85	167	90	88	79
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	108	94	186	100	98	88
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.7	11	8.5
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	65%	53%	0%	0%
Vol Thru, %	35%	0%	100%	0%
Vol Right, %	0%	47%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	257	182	88	79
LT Vol	167	97	0	0
Through Vol	90	0	88	0
RT Vol	0	85	0	79
Lane Flow Rate	286	202	98	88
Geometry Grp	5	2	7	7
Degree of Util (X)	0.387	0.273	0.144	0.112
Departure Headway (Hd)	4.883	4.86	5.306	4.6
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	734	736	673	775
Service Time	2.934	2.909	3.061	2.355
HCM Lane V/C Ratio	0.39	0.274	0.146	0.114
HCM Control Delay	11	9.7	9	7.9
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.8	1.1	0.5	0.4

Queues  
24: Brunswick Rd & Loma Rica Dr













						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	59	198	673	147	299	345
v/c Ratio	0.28	0.32	0.80	0.19	0.71	0.23
Control Delay	32.7	8.2	28.1	3.7	34.0	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	8.2	28.1	3.7	34.0	3.1
Queue Length 50th (ft)	24	25	262	0	120	37
Queue Length 95th (ft)	59	62	#518	33	212	74
Internal Link Dist (ft)	1089		974			683
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	394	730	888	830	556	1531
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.27	0.76	0.18	0.54	0.23

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project AM Peak  
 To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	182	619	135	275	317
Future Volume (veh/h)	54	182	619	135	275	317
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	59	198	673	147	299	345
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	233	522	755	640	355	1274
Arrive On Green	0.13	0.13	0.41	0.41	0.20	0.70
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	59	198	673	147	299	345
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	1.9	6.2	21.7	3.9	10.5	4.5
Cycle Q Clear(g_c), s	1.9	6.2	21.7	3.9	10.5	4.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	233	522	755	640	355	1274
V/C Ratio(X)	0.25	0.38	0.89	0.23	0.84	0.27
Avail Cap(c_a), veh/h	386	659	869	736	545	1415
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.7	16.0	17.3	12.1	24.3	3.6
Incr Delay (d2), s/veh	0.6	0.5	10.4	0.2	7.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.1	9.4	1.1	4.5	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.2	16.4	27.7	12.2	31.5	3.7
LnGrp LOS	C	B	C	B	C	A
Approach Vol, veh/h	257		820			644
Approach Delay, s/veh	18.4		25.0			16.6
Approach LOS	B		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	18.0	32.0			50.1	13.4
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	12.5	23.7			6.5	8.2
Green Ext Time (p_c), s	0.5	2.5			2.0	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			20.9			
HCM 6th LOS			C			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	9.4	24.7	6.1	13.3

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.2	0.0	0.6
Total Del/Veh (s)	5.6	9.0	16.3	10.2

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.2
Total Del/Veh (s)	8.4	9.4	1.1	6.2

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.6	1.9	1.0
Total Del/Veh (s)	14.3	8.2	12.0	12.2	10.5

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.4	2.7	0.8
Total Del/Veh (s)	10.0	12.4	13.9	34.0	17.5

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.8	7.3	24.6	12.7

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.3
Total Del/Veh (s)	11.0	18.9	17.2	5.1	12.6

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.1	0.2	1.7	0.9
Total Del/Veh (s)	19.3	18.6	11.7	15.5

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.5	0.0	0.2	0.4
Total Del/Veh (s)	14.4	7.1	13.4	10.0

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Total Zone Performance

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Denied Del/Veh (s)	1.1
Total Del/Veh (s)	328.2



Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	112	261	112	76
Average Queue (ft)	72	120	50	31
95th Queue (ft)	114	214	94	64
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	5			
Queuing Penalty (veh)	16			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	112	123	181	120	106
Average Queue (ft)	57	43	83	69	51
95th Queue (ft)	97	91	146	111	93
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			3	1
Queuing Penalty (veh)	0			4	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	8		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	117	104	33	87	34
Average Queue (ft)	62	53	10	45	2
95th Queue (ft)	98	81	33	72	13
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	T	R	L	L	T
Maximum Queue (ft)	53	101	104	137	136	107	99	135	118
Average Queue (ft)	20	45	49	51	58	40	29	69	51
95th Queue (ft)	47	81	83	103	103	77	69	114	97
Link Distance (ft)	777	160	160	160	1486				1622
Upstream Blk Time (%)				0					
Queuing Penalty (veh)				0					
Storage Bay Dist (ft)						115	360	360	
Storage Blk Time (%)					1	0			
Queuing Penalty (veh)					1	0			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	150	168	102	172	173	64	102	170	194	87	90
Average Queue (ft)	51	80	57	52	72	19	47	74	112	30	42
95th Queue (ft)	116	150	98	127	151	51	81	146	172	69	71
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	2	3						
Queuing Penalty (veh)	0	1	0	6	9						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	2			0	0	0		
Queuing Penalty (veh)			2	2			0	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	114	111	94	138	219	220	299
Average Queue (ft)	36	35	22	30	155	131	50
95th Queue (ft)	89	84	69	95	226	223	214
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					16	10	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	85	98	130	144	118	114	156	227	74	120	89	75
Average Queue (ft)	34	54	65	80	59	49	72	111	17	57	36	33
95th Queue (ft)	68	86	113	123	96	88	123	186	48	97	75	62
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)						0	1					
Queuing Penalty (veh)						1	1					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	80
Average Queue (ft)	34
95th Queue (ft)	68
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	129	193	81	120	137	166	276	172
Average Queue (ft)	56	96	26	52	61	37	126	33
95th Queue (ft)	106	170	61	96	113	104	223	89
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)				0			1	0
Queuing Penalty (veh)				0			3	0

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	203	109	166	154	142	135	85
Average Queue (ft)	84	28	66	61	56	57	40
95th Queue (ft)	158	70	123	123	114	105	71
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)			0	0	0		
Queuing Penalty (veh)			0	0	0		
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	1	0					

Zone Summary

Zone wide Queuing Penalty: 57

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project AM Peak  
To SR 49  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	36	3.0	0.251	7.8	LOS A	1.1	27.7	0.62	0.61	0.62	33.3
8	T1	67	3.0	0.251	7.8	LOS A	1.1	27.7	0.62	0.61	0.62	33.2
18	R2	83	3.0	0.251	7.8	LOS A	1.1	27.7	0.62	0.61	0.62	32.3
Approach		186	3.0	0.251	7.8	LOS A	1.1	27.7	0.62	0.61	0.62	32.8
East: Idaho Maryland Rd												
1	L2	257	3.0	0.265	6.4	LOS A	1.2	29.7	0.50	0.43	0.50	31.9
6	T1	141	3.0	0.425	8.6	LOS A	2.2	55.2	0.58	0.52	0.58	33.2
16	R2	270	3.0	0.425	8.6	LOS A	2.2	55.2	0.58	0.52	0.58	32.2
Approach		668	3.0	0.425	7.7	LOS A	2.2	55.2	0.55	0.48	0.55	32.3
North: Main St												
7	L2	129	3.0	0.331	7.3	LOS A	1.4	36.6	0.53	0.49	0.53	32.9
4	T1	183	3.0	0.331	7.3	LOS A	1.4	36.6	0.53	0.49	0.53	32.9
14	R2	207	3.0	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		519	3.0	0.331	4.4	LOS A	1.4	36.6	0.32	0.29	0.32	34.4
West: Main St												
5	L2	276	3.0	0.541	12.0	LOS B	3.8	98.6	0.69	0.83	1.07	30.5
2	T1	163	3.0	0.541	12.0	LOS B	3.8	98.6	0.69	0.83	1.07	30.4
12	R2	14	3.0	0.541	12.0	LOS B	3.8	98.6	0.69	0.83	1.07	29.6
Approach		453	3.0	0.541	12.0	LOS B	3.8	98.6	0.69	0.83	1.07	30.4
All Vehicles		1826	3.0	0.541	7.8	LOS A	3.8	98.6	0.53	0.53	0.62	32.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\21-25 EPAPPP To SR 49\5.1 EPAPPP To SR 49 AM Peak Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	16.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	60	282	3	0	0	0	0	122	156	174	331	0
Future Vol, veh/h	60	282	3	0	0	0	0	122	156	174	331	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	313	3	0	0	0	0	136	173	193	368	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.1	16.1	17.4
HCM LOS	B	C	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	30%	0%	100%	0%
Vol Thru, %	44%	70%	98%	0%	100%
Vol Right, %	56%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	278	201	144	174	331
LT Vol	0	60	0	174	0
Through Vol	122	141	141	0	331
RT Vol	156	0	3	0	0
Lane Flow Rate	309	223	160	193	368
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.531	0.435	0.304	0.363	0.639
Departure Headway (Hd)	6.187	7.004	6.837	6.767	6.259
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	581	514	525	530	577
Service Time	4.241	4.759	4.592	4.524	4.015
HCM Lane V/C Ratio	0.532	0.434	0.305	0.364	0.638
HCM Control Delay	16.1	15.1	12.6	13.4	19.5
HCM Lane LOS	C	C	B	B	C
HCM 95th-tile Q	3.1	2.2	1.3	1.6	4.5

Intersection	
Intersection Delay, s/veh	38.9
Intersection LOS	E

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	220	53	66	776	169	248
Future Vol, veh/h	220	53	66	776	169	248
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	244	59	73	862	188	276
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	18.1	56.8	16.4
HCM LOS	C	F	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	20%	0%
Vol Thru, %	0%	0%	81%	80%	100%
Vol Right, %	0%	100%	19%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	169	248	273	325	517
LT Vol	169	0	0	66	0
Through Vol	0	0	220	259	517
RT Vol	0	248	53	0	0
Lane Flow Rate	188	276	303	361	575
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.411	0.512	0.559	0.671	1.053
Departure Headway (Hd)	8.069	6.841	6.793	6.698	6.595
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	449	529	534	541	552
Service Time	5.769	4.541	4.793	4.433	4.329
HCM Lane V/C Ratio	0.419	0.522	0.567	0.667	1.042
HCM Control Delay	16.3	16.5	18.1	22.1	78.6
HCM Lane LOS	C	C	C	C	F
HCM 95th-tile Q	2	2.9	3.4	5	16.6

**Intersection**

Intersection Delay, s/veh 22.3

Intersection LOS C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	447	72	23	717	93	30
Future Vol, veh/h	447	72	23	717	93	30
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	514	83	26	824	107	34
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	15.2	29	12.1
HCM LOS	C	D	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	76%	0%	0%	9%	0%
Vol Thru, %	0%	100%	67%	91%	100%
Vol Right, %	24%	0%	33%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	123	298	221	262	478
LT Vol	93	0	0	23	0
Through Vol	0	298	149	239	478
RT Vol	30	0	72	0	0
Lane Flow Rate	141	343	254	301	549
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.263	0.58	0.414	0.488	0.884
Departure Headway (Hd)	6.708	6.101	5.87	5.839	5.794
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	536	593	612	617	626
Service Time	4.746	3.842	3.611	3.573	3.528
HCM Lane V/C Ratio	0.263	0.578	0.415	0.488	0.877
HCM Control Delay	12.1	17	12.7	14	37.2
HCM Lane LOS	B	C	B	B	E
HCM 95th-tile Q	1	3.7	2	2.7	10.5



Intersection												
Int Delay, s/veh	14.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗	↘		↗	↘	↗		↗	↖	↗
Traffic Vol, veh/h	0	0	240	25	0	76	299	507	57	94	484	14
Future Vol, veh/h	0	0	240	25	0	76	299	507	57	94	484	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	50	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	247	26	0	78	308	523	59	97	499	14

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	-	499	1993	-	553	513	0	0	582	0	0
Stage 1	-	-	-	1169	-	-	-	-	-	-	-	-
Stage 2	-	-	-	824	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	7.12	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	6.12	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	3.518	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	572	45	0	533	1052	-	-	992	-	-
Stage 1	0	0	-	235	0	-	-	-	-	-	-	-
Stage 2	0	0	-	367	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	-	572	~ 18	-	533	1052	-	-	992	-	-
Mov Cap-2 Maneuver	-	-	-	~ 18	-	-	-	-	-	-	-	-
Stage 1	-	-	-	166	-	-	-	-	-	-	-	-
Stage 2	-	-	-	188	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	16		176.6		3.4		1.4	
HCM LOS	C		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1052	-	-	572	18	533	992	-	-
HCM Lane V/C Ratio	0.293	-	-	0.433	1.432	0.147	0.098	-	-
HCM Control Delay (s)	9.8	-	-	16	674.1	12.9	9	-	-
HCM Lane LOS	A	-	-	C	F	B	A	-	-
HCM 95th %tile Q(veh)	1.2	-	-	2.2	3.6	0.5	0.3	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙	↗	↙	↑	↑↑	
Traffic Vol, veh/h	94	58	25	767	702	42
Future Vol, veh/h	94	58	25	767	702	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	61	26	807	739	44

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1620	392	783	0	-	0
Stage 1	761	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	103	608	833	-	-	-
Stage 1	423	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	100	608	833	-	-	-
Mov Cap-2 Maneuver	292	-	-	-	-	-
Stage 1	410	-	-	-	-	-
Stage 2	414	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	833	-	292	608	-	-
HCM Lane V/C Ratio	0.032	-	0.339	0.1	-	-
HCM Control Delay (s)	9.5	-	23.5	11.6	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.4	0.3	-	-

Intersection	
Intersection Delay, s/veh	37.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	30	29	27	25	44	85	21	393	36	153	550	33
Future Vol, veh/h	30	29	27	25	44	85	21	393	36	153	550	33
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	29	27	25	44	86	21	397	36	155	556	33
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	12.1	13	27.7	51.5
HCM LOS	B	B	D	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	35%	16%	100%	0%
Vol Thru, %	0%	92%	34%	29%	0%	94%
Vol Right, %	0%	8%	31%	55%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	21	429	86	154	153	583
LT Vol	21	0	30	25	153	0
Through Vol	0	393	29	44	0	550
RT Vol	0	36	27	85	0	33
Lane Flow Rate	21	433	87	156	155	589
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.042	0.781	0.179	0.3	0.287	1.002
Departure Headway (Hd)	7.055	6.485	7.418	6.951	6.675	6.126
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	509	559	483	516	541	595
Service Time	4.774	4.204	5.475	4.999	4.389	3.84
HCM Lane V/C Ratio	0.041	0.775	0.18	0.302	0.287	0.99
HCM Control Delay	10.1	28.6	12.1	13	12.1	61.9
HCM Lane LOS	B	D	B	B	B	F
HCM 95th-tile Q	0.1	7.2	0.6	1.3	1.2	14.9

Intersection						
Int Delay, s/veh	47.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	78	226	239	273	409	116
Future Vol, veh/h	78	226	239	273	409	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	85	246	260	297	445	126

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	260	0	-	0	676
Stage 1	-	-	-	-	260
Stage 2	-	-	-	-	416
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1304	-	-	0 ~ 419	779
Stage 1	-	-	-	0	783
Stage 2	-	-	-	0	666
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1304	-	-	- ~ 392	779
Mov Cap-2 Maneuver	-	-	-	- ~ 392	-
Stage 1	-	-	-	-	732
Stage 2	-	-	-	-	666

Approach	EB	WB	SB
HCM Control Delay, s	2	0	95.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1304	-	-	392	779
HCM Lane V/C Ratio	0.065	-	-	1.134	0.162
HCM Control Delay (s)	8	-	-	119.2	10.5
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	16.6	0.6

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	1.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	22	15	365	537	64
Future Vol, veh/h	85	22	15	365	537	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	24	16	397	584	70

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1048	619	654	0	-	0
Stage 1	619	-	-	-	-	-
Stage 2	429	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	252	489	933	-	-	-
Stage 1	537	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	248	489	933	-	-	-
Mov Cap-2 Maneuver	443	-	-	-	-	-
Stage 1	528	-	-	-	-	-
Stage 2	657	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	933	-	452	-	-
HCM Lane V/C Ratio	0.017	-	0.257	-	-
HCM Control Delay (s)	8.9	-	15.7	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	76	0	0	98	0	10
Future Vol, veh/h	76	0	0	98	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	0	0	107	0	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	83	0	190
Stage 1	-	-	-	-	83
Stage 2	-	-	-	-	107
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1514	-	799
Stage 1	-	-	-	-	940
Stage 2	-	-	-	-	917
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1514	-	799
Mov Cap-2 Maneuver	-	-	-	-	799
Stage 1	-	-	-	-	940
Stage 2	-	-	-	-	917

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	976	-	-	1514	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	35.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	329	120	12	425	245	37
Future Vol, veh/h	329	120	12	425	245	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	150	15	531	306	46

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	561	0	972
Stage 1	-	-	-	-	411
Stage 2	-	-	-	-	561
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1010	-	~ 280
Stage 1	-	-	-	-	669
Stage 2	-	-	-	-	571
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1010	-	~ 276
Mov Cap-2 Maneuver	-	-	-	-	~ 276
Stage 1	-	-	-	-	669
Stage 2	-	-	-	-	562

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	148.4
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	298	-	-	1010	-
HCM Lane V/C Ratio	1.183	-	-	0.015	-
HCM Control Delay (s)	148.4	-	-	8.6	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	15.4	-	-	0	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	15.4
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	212	131	234	75	112	208
Future Vol, veh/h	212	131	234	75	112	208
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	249	154	275	88	132	245
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	18.3	15.3	12.4
HCM LOS	C	C	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	62%	0%	100%	0%
Vol Thru, %	38%	76%	0%	0%
Vol Right, %	0%	24%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	343	309	112	208
LT Vol	212	0	112	0
Through Vol	131	234	0	0
RT Vol	0	75	0	208
Lane Flow Rate	404	364	132	245
Geometry Grp	2	2	7	7
Degree of Util (X)	0.638	0.556	0.26	0.399
Departure Headway (Hd)	5.695	5.508	7.091	5.869
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	634	654	506	612
Service Time	3.745	3.56	4.845	3.622
HCM Lane V/C Ratio	0.637	0.557	0.261	0.4
HCM Control Delay	18.3	15.3	12.3	12.5
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	4.6	3.4	1	1.9



**Intersection**

Intersection Delay, s/veh 15.9  
Intersection LOS C







Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	Y
Traffic Vol, veh/h	144	189	130	172	179	179
Future Vol, veh/h	144	189	130	172	179	179
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	228	157	207	216	216
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	18.2	17.8	12.1
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	43%	43%	0%	0%
Vol Thru, %	57%	0%	100%	0%
Vol Right, %	0%	57%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	302	333	179	179
LT Vol	130	144	0	0
Through Vol	172	0	179	0
RT Vol	0	189	0	179
Lane Flow Rate	364	401	216	216
Geometry Grp	5	2	7	7
Degree of Util (X)	0.603	0.634	0.379	0.336
Departure Headway (Hd)	5.971	5.689	6.329	5.615
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	604	634	567	636
Service Time	4.032	3.748	4.095	3.382
HCM Lane V/C Ratio	0.603	0.632	0.381	0.34
HCM Control Delay	17.8	18.2	12.9	11.2
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	4	4.5	1.8	1.5













Queues  
24: Brunswick Rd & Loma Rica Dr

EPAP plus Project PM Peak  
To SR 49

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	159	358	503	49	132	641
v/c Ratio	0.48	0.49	0.72	0.08	0.41	0.50
Control Delay	30.0	8.5	23.5	5.1	28.6	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	8.5	23.5	5.1	28.6	7.4
Queue Length 50th (ft)	52	36	150	0	43	109
Queue Length 95th (ft)	126	107	303	19	103	202
Internal Link Dist (ft)	946		917			653
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	474	1001	1062	923	670	1607
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.36	0.47	0.05	0.20	0.40
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project PM Peak  
 To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	146	329	463	45	121	590
Future Volume (veh/h)	146	329	463	45	121	590
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	159	358	503	49	132	641
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	427	534	626	530	174	992
Arrive On Green	0.25	0.25	0.34	0.34	0.10	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	159	358	503	49	132	641
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	3.8	10.0	12.7	1.1	3.7	12.5
Cycle Q Clear(g_c), s	3.8	10.0	12.7	1.1	3.7	12.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	427	534	626	530	174	992
V/C Ratio(X)	0.37	0.67	0.80	0.09	0.76	0.65
Avail Cap(c_a), veh/h	484	585	1089	923	683	1774
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	14.1	15.1	11.3	22.2	8.1
Incr Delay (d2), s/veh	0.5	2.6	2.5	0.1	6.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.3	4.4	0.3	1.6	3.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.4	16.8	17.6	11.4	28.9	8.8
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	517		552			773
Approach Delay, s/veh	16.6		17.0			12.3
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.2	23.2			33.3	17.3
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	5.7	14.7			14.5	12.0
Green Ext Time (p_c), s	0.3	2.7			4.3	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.9			
HCM 6th LOS			B			



# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project PM Peak  
To SR 49  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	75	3.0	0.245	6.6	LOS A	1.1	28.6	0.54	0.47	0.54	33.4
8	T1	71	3.0	0.245	6.6	LOS A	1.1	28.6	0.54	0.47	0.54	33.4
18	R2	73	3.0	0.245	6.6	LOS A	1.1	28.6	0.54	0.47	0.54	32.4
Approach		218	3.0	0.245	6.6	LOS A	1.1	28.6	0.54	0.47	0.54	33.1
East: Idaho Maryland Rd												
1	L2	372	3.0	0.375	7.7	LOS A	1.8	46.7	0.54	0.46	0.54	31.3
6	T1	258	3.0	0.493	9.5	LOS A	3.3	83.3	0.61	0.58	0.72	32.8
16	R2	234	3.0	0.493	9.5	LOS A	3.3	83.3	0.61	0.58	0.72	31.8
Approach		863	3.0	0.493	8.7	LOS A	3.3	83.3	0.58	0.53	0.64	31.9
North: Main St												
7	L2	77	3.0	0.389	9.8	LOS A	1.8	47.2	0.65	0.70	0.80	32.2
4	T1	213	3.0	0.389	9.8	LOS A	1.8	47.2	0.65	0.70	0.80	32.1
14	R2	329	3.0	0.203	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		619	3.0	0.389	4.6	LOS A	1.8	47.2	0.30	0.33	0.38	34.6
West: Main St												
5	L2	207	3.0	0.452	10.7	LOS B	2.5	63.9	0.66	0.75	0.92	31.0
2	T1	107	3.0	0.452	10.7	LOS B	2.5	63.9	0.66	0.75	0.92	30.9
12	R2	35	3.0	0.452	10.7	LOS B	2.5	63.9	0.66	0.75	0.92	30.1
Approach		349	3.0	0.452	10.7	LOS B	2.5	63.9	0.66	0.75	0.92	30.9
All Vehicles		2049	3.0	0.493	7.6	LOS A	3.3	83.3	0.50	0.50	0.60	32.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	15	96	6	0	0	0	0	86	100	89	100	0
Future Vol, veh/h	15	96	6	0	0	0	0	86	100	89	100	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	109	7	0	0	0	0	98	114	101	114	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9	9.8	9.1
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	24%	0%	100%	0%
Vol Thru, %	46%	76%	89%	0%	100%
Vol Right, %	54%	0%	11%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	186	63	54	89	100
LT Vol	0	15	0	89	0
Through Vol	86	48	48	0	100
RT Vol	100	0	6	0	0
Lane Flow Rate	211	72	61	101	114
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.284	0.113	0.094	0.157	0.16
Departure Headway (Hd)	4.83	5.688	5.49	5.587	5.084
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	744	629	652	642	705
Service Time	2.864	3.432	3.234	3.323	2.82
HCM Lane V/C Ratio	0.284	0.114	0.094	0.157	0.162
HCM Control Delay	9.8	9.2	8.8	9.4	8.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	1.2	0.4	0.3	0.6	0.6

Intersection	
Intersection Delay, s/veh	17.2
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	197	19	32	204	125	367
Future Vol, veh/h	197	19	32	204	125	367
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	256	25	42	265	162	477
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	15.9	12.5	20.1
HCM LOS	C	B	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	32%	0%
Vol Thru, %	0%	0%	91%	68%	100%
Vol Right, %	0%	100%	9%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	125	367	216	100	136
LT Vol	125	0	0	32	0
Through Vol	0	0	197	68	136
RT Vol	0	367	19	0	0
Lane Flow Rate	162	477	281	130	177
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.307	0.74	0.502	0.25	0.332
Departure Headway (Hd)	6.807	5.592	6.439	6.933	6.769
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	528	643	558	517	530
Service Time	4.562	3.346	4.496	4.697	4.534
HCM Lane V/C Ratio	0.307	0.742	0.504	0.251	0.334
HCM Control Delay	12.6	22.7	15.9	12	12.9
HCM Lane LOS	B	C	C	B	B
HCM 95th-tile Q	1.3	6.5	2.8	1	1.4

**Intersection**

Intersection Delay, s/veh 11.5  
Intersection LOS B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	475	68	20	175	44	7
Future Vol, veh/h	475	68	20	175	44	7
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	609	87	26	224	56	9
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	12.4	9.5	9.6
HCM LOS	B	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	86%	0%	0%	26%	0%
Vol Thru, %	0%	100%	70%	74%	100%
Vol Right, %	14%	0%	30%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	51	317	226	78	117
LT Vol	44	0	0	20	0
Through Vol	0	317	158	58	117
RT Vol	7	0	68	0	0
Lane Flow Rate	65	406	290	100	150
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.106	0.559	0.382	0.153	0.223
Departure Headway (Hd)	5.857	4.955	4.744	5.498	5.37
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	609	727	757	651	667
Service Time	3.914	2.689	2.478	3.246	3.118
HCM Lane V/C Ratio	0.107	0.558	0.383	0.154	0.225
HCM Control Delay	9.6	13.8	10.4	9.2	9.7
HCM Lane LOS	A	B	B	A	A
HCM 95th-tile Q	0.4	3.5	1.8	0.5	0.8



Intersection												
Int Delay, s/veh	6.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	0	0	162	46	0	55	132	239	10	11	238	3
Future Vol, veh/h	0	0	162	46	0	55	132	239	10	11	238	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	195	55	0	66	159	288	12	13	287	4

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	931	287	1025	929	294	291	0	0	300	0	0
Stage 1	-	313	-	612	612	-	-	-	-	-	-	-
Stage 2	-	618	-	413	317	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	267	752	213	268	745	1271	-	-	1261	-	-
Stage 1	0	657	-	480	484	-	-	-	-	-	-	-
Stage 2	0	481	-	616	654	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	231	752	141	232	745	1271	-	-	1261	-	-
Mov Cap-2 Maneuver	-	231	-	141	232	-	-	-	-	-	-	-
Stage 1	-	650	-	420	424	-	-	-	-	-	-	-
Stage 2	-	421	-	451	647	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.5		26.7		2.9		0.3	
HCM LOS	B		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1271	-	-	752	141	745	1261	-	-
HCM Lane V/C Ratio	0.125	-	-	0.26	0.393	0.089	0.011	-	-
HCM Control Delay (s)	8.2	-	-	11.5	46.2	10.3	7.9	-	-
HCM Lane LOS	A	-	-	B	E	B	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1	1.7	0.3	0	-	-

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	28	36	368	382	49
Future Vol, veh/h	13	28	36	368	382	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	37	47	484	503	64

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1113	284	567	0	-	0
Stage 1	535	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	216	714	1003	-	-	-
Stage 1	552	-	-	-	-	-
Stage 2	560	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	206	714	1003	-	-	-
Mov Cap-2 Maneuver	408	-	-	-	-	-
Stage 1	526	-	-	-	-	-
Stage 2	560	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1003	-	408	714	-	-
HCM Lane V/C Ratio	0.047	-	0.042	0.052	-	-
HCM Control Delay (s)	8.8	-	14.2	10.3	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	20	10	20	29	26	83	24	342	6	30	184	11
Future Vol, veh/h	20	10	20	29	26	83	24	342	6	30	184	11
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	11	22	32	29	92	27	380	7	33	204	12
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.4	10.1	15.2	10.8
HCM LOS	A	B	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	40%	21%	100%	0%
Vol Thru, %	0%	98%	20%	19%	0%	94%
Vol Right, %	0%	2%	40%	60%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	24	348	50	138	30	195
LT Vol	24	0	20	29	30	0
Through Vol	0	342	10	26	0	184
RT Vol	0	6	20	83	0	11
Lane Flow Rate	27	387	56	153	33	217
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.044	0.586	0.09	0.232	0.057	0.336
Departure Headway (Hd)	5.969	5.452	5.807	5.439	6.124	5.578
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	603	665	616	659	586	646
Service Time	3.669	3.152	3.851	3.477	3.853	3.308
HCM Lane V/C Ratio	0.045	0.582	0.091	0.232	0.056	0.336
HCM Control Delay	8.9	15.6	9.4	10.1	9.2	11.1
HCM Lane LOS	A	C	A	B	A	B
HCM 95th-tile Q	0.1	3.8	0.3	0.9	0.2	1.5

Intersection						
Int Delay, s/veh	5.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	52	123	127	245	128	47
Future Vol, veh/h	52	123	127	245	128	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	154	159	306	160	59

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	159	0	-	0	443
Stage 1	-	-	-	-	159
Stage 2	-	-	-	-	284
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1420	-	-	0	572
Stage 1	-	-	-	0	870
Stage 2	-	-	-	0	764
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1420	-	-	-	546
Mov Cap-2 Maneuver	-	-	-	-	546
Stage 1	-	-	-	-	830
Stage 2	-	-	-	-	764

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1420	-	-	546	886
HCM Lane V/C Ratio	0.046	-	-	0.293	0.066
HCM Control Delay (s)	7.7	-	-	14.3	9.4
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.2	0.2

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	15	22	317	138	95
Future Vol, veh/h	54	15	22	317	138	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	17	25	360	157	108

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	621	211	265	0	-	0
Stage 1	211	-	-	-	-	-
Stage 2	410	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	451	829	1299	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	670	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	442	829	1299	-	-	-
Mov Cap-2 Maneuver	594	-	-	-	-	-
Stage 1	808	-	-	-	-	-
Stage 2	670	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1299	-	633	-	-
HCM Lane V/C Ratio	0.019	-	0.124	-	-
HCM Control Delay (s)	7.8	-	11.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	40	0	0	61	0	10
Future Vol, veh/h	40	0	0	61	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	43	0	0	66	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	43	0	109 43
Stage 1	-	-	-	-	43 -
Stage 2	-	-	-	-	66 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1566	-	888 1027
Stage 1	-	-	-	-	979 -
Stage 2	-	-	-	-	957 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1566	-	888 1027
Mov Cap-2 Maneuver	-	-	-	-	888 -
Stage 1	-	-	-	-	979 -
Stage 2	-	-	-	-	957 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1027	-	-	1566	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.5	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Vol, veh/h	186	173	10	154	39	6
Future Vol, veh/h	186	173	10	154	39	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	248	231	13	205	52	8

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	479	0	479
Stage 1	-	-	-	-	248
Stage 2	-	-	-	-	231
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1083	-	545
Stage 1	-	-	-	-	793
Stage 2	-	-	-	-	807
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1083	-	538
Mov Cap-2 Maneuver	-	-	-	-	538
Stage 1	-	-	-	-	793
Stage 2	-	-	-	-	797

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	562	-	-	1083	-
HCM Lane V/C Ratio	0.107	-	-	0.012	-
HCM Control Delay (s)	12.2	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	48	124	89	47	30	59
Future Vol, veh/h	48	124	89	47	30	59
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	146	105	55	35	69
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.9	8.2	8.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	28%	0%	100%	0%
Vol Thru, %	72%	65%	0%	0%
Vol Right, %	0%	35%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	172	136	30	59
LT Vol	48	0	30	0
Through Vol	124	89	0	0
RT Vol	0	47	0	59
Lane Flow Rate	202	160	35	69
Geometry Grp	2	2	7	7
Degree of Util (X)	0.248	0.187	0.057	0.089
Departure Headway (Hd)	4.416	4.207	5.834	4.626
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	815	854	615	775
Service Time	2.432	2.223	3.56	2.351
HCM Lane V/C Ratio	0.248	0.187	0.057	0.089
HCM Control Delay	8.9	8.2	8.9	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1	0.7	0.2	0.3



Intersection







Intersection Delay, s/veh 8.2  
Intersection LOS A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	49	89	38	43	46
Future Vol, veh/h	32	49	89	38	43	46
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	63	114	49	55	59
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.9	8.7	7.6
HCM LOS	A	A	A













Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	70%	40%	0%	0%
Vol Thru, %	30%	0%	100%	0%
Vol Right, %	0%	60%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	127	81	43	46
LT Vol	89	32	0	0
Through Vol	38	0	43	0
RT Vol	0	49	0	46
Lane Flow Rate	163	104	55	59
Geometry Grp	5	2	7	7
Degree of Util (X)	0.201	0.124	0.075	0.069
Departure Headway (Hd)	4.543	4.282	4.906	4.203
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	795	841	735	857
Service Time	2.543	2.287	2.606	1.903
HCM Lane V/C Ratio	0.205	0.124	0.075	0.069
HCM Control Delay	8.7	7.9	8	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.4	0.2	0.2

Queues  
24: Brunswick Rd & Loma Rica Dr

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	30	87	364	130	230	224
v/c Ratio	0.11	0.14	0.57	0.21	0.48	0.14
Control Delay	24.2	3.4	17.3	4.3	19.9	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	3.4	17.3	4.3	19.9	2.2
Queue Length 50th (ft)	5	0	48	0	32	0
Queue Length 95th (ft)	35	21	198	31	146	42
Internal Link Dist (ft)	1182		910			653
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	639	964	1387	1209	902	1711
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.09	0.26	0.11	0.25	0.13
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project 0630  
 To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	28	80	335	120	212	206
Future Volume (veh/h)	28	80	335	120	212	206
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	30	87	364	130	230	224
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	166	419	538	456	305	1115
Arrive On Green	0.10	0.10	0.29	0.29	0.18	0.61
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	30	87	364	130	230	224
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.6	1.6	6.4	2.4	4.6	2.0
Cycle Q Clear(g_c), s	0.6	1.6	6.4	2.4	4.6	2.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	166	419	538	456	305	1115
V/C Ratio(X)	0.18	0.21	0.68	0.28	0.75	0.20
Avail Cap(c_a), veh/h	674	871	1516	1285	951	2470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.1	10.2	11.3	9.9	14.2	3.1
Incr Delay (d2), s/veh	0.5	0.2	1.5	0.3	3.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	1.8	0.5	1.6	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.7	10.5	12.8	10.2	18.0	3.2
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	117		494			454
Approach Delay, s/veh	11.8		12.1			10.7
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.5	16.5			28.0	8.4
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.6	8.4			4.0	3.6
Green Ext Time (p_c), s	0.5	2.3			1.2	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.5			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	2.8	9.3	4.3	5.0

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.5	0.0	0.5
Total Del/Veh (s)	4.4	6.0	8.3	6.2

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	5.4	7.5	0.4	3.8

8: Main St & Maltman Dr/Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.2	2.1	1.0
Total Del/Veh (s)	15.4	4.4	8.3	6.7	6.1

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.9	2.9	0.9
Total Del/Veh (s)	4.4	9.1	22.7	37.9	16.8

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.5	4.1	20.1	8.7

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	1.3	0.0	0.2
Total Del/Veh (s)	5.6	9.0	11.3	1.2	5.3

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	1.6	0.9
Total Del/Veh (s)	11.6	10.4	7.1	9.0

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.8	0.0	0.1	0.5
Total Del/Veh (s)	6.5	5.4	8.3	6.1

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Total Zone Performance

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Denied Del/Veh (s)	1.1
Total Del/Veh (s)	72.2

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	84	108	72	53
Average Queue (ft)	31	47	23	15
95th Queue (ft)	66	87	56	41
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	86	59	85	92	71
Average Queue (ft)	40	23	35	46	23
95th Queue (ft)	71	52	71	82	55
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB
Directions Served	LT	TR	L	T
Maximum Queue (ft)	67	53	31	48
Average Queue (ft)	35	26	6	30
95th Queue (ft)	55	50	27	45
Link Distance (ft)	1196	1196		262
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			100	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Main St & Maltman Dr/Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	34	39	49	79	24	69	44	38	75	62
Average Queue (ft)	6	16	15	25	1	26	14	7	34	15
95th Queue (ft)	26	36	36	56	10	56	39	28	64	41
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	55	71	70	64	116	32	34	116	141	53	57
Average Queue (ft)	11	21	29	10	27	6	8	32	76	13	23
95th Queue (ft)	38	56	63	39	79	25	28	82	127	41	50
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)				0	0						
Queuing Penalty (veh)				0	0						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)				0							
Queuing Penalty (veh)				0							

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	40	31	25	46	197	129	32
Average Queue (ft)	5	5	2	3	92	59	1
95th Queue (ft)	24	19	12	22	160	100	18
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					3	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							



Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	42	70	70	92	50	56	84	114	26	70	39	48
Average Queue (ft)	13	31	18	40	19	18	31	52	3	26	14	14
95th Queue (ft)	38	60	51	78	46	45	65	97	17	52	34	41
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	34
Average Queue (ft)	6
95th Queue (ft)	26
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	77	110	51	61	65	60	130	46
Average Queue (ft)	28	40	15	26	27	20	60	20
95th Queue (ft)	62	84	41	52	54	50	107	41
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	82	44	97	94	90	62	57
Average Queue (ft)	32	17	41	29	22	25	27
95th Queue (ft)	69	39	77	70	65	57	50
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	155						
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 1

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project 0630-0730 AM

To SR 49

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	16	3.0	0.089	4.7	LOS A	0.4	9.3	0.45	0.34	0.45	34.9
8	T1	22	3.0	0.089	4.7	LOS A	0.4	9.3	0.45	0.34	0.45	34.8
18	R2	45	3.0	0.089	4.7	LOS A	0.4	9.3	0.45	0.34	0.45	33.8
Approach		83	3.0	0.089	4.7	LOS A	0.4	9.3	0.45	0.34	0.45	34.2
East: Idaho Maryland Rd												
1	L2	148	3.0	0.128	4.2	LOS A	0.5	13.4	0.32	0.19	0.32	32.9
6	T1	62	3.0	0.156	4.5	LOS A	0.7	16.8	0.33	0.20	0.33	35.4
16	R2	118	3.0	0.156	4.5	LOS A	0.7	16.8	0.33	0.20	0.33	34.3
Approach		329	3.0	0.156	4.3	LOS A	0.7	16.8	0.32	0.20	0.32	33.8
North: Main St												
7	L2	70	3.0	0.197	5.0	LOS A	0.8	20.6	0.35	0.24	0.35	34.4
4	T1	153	3.0	0.197	5.0	LOS A	0.8	20.6	0.35	0.24	0.35	34.3
14	R2	77	3.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		300	3.0	0.197	3.7	LOS A	0.8	20.6	0.26	0.18	0.26	35.0
West: Main St												
5	L2	148	3.0	0.295	6.6	LOS A	1.3	32.2	0.49	0.42	0.49	33.0
2	T1	122	3.0	0.295	6.6	LOS A	1.3	32.2	0.49	0.42	0.49	33.0
12	R2	23	3.0	0.295	6.6	LOS A	1.3	32.2	0.49	0.42	0.49	32.1
Approach		294	3.0	0.295	6.6	LOS A	1.3	32.2	0.49	0.42	0.49	32.9
All Vehicles		1005	3.0	0.295	4.8	LOS A	1.3	32.2	0.36	0.27	0.36	33.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\21-25 EPAPPP To SR 49\5.3 EPAPPP To SR 49 0630 AM Idaho Main.sjp8

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	47	329	3	0	0	0	0	96	155	164	304	0
Future Vol, veh/h	47	329	3	0	0	0	0	96	155	164	304	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	52	366	3	0	0	0	0	107	172	182	338	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.1	14.8	16.2
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	22%	0%	100%	0%
Vol Thru, %	38%	78%	98%	0%	100%
Vol Right, %	62%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	251	212	168	164	304
LT Vol	0	47	0	164	0
Through Vol	96	165	165	0	304
RT Vol	155	0	3	0	0
Lane Flow Rate	279	235	186	182	338
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.479	0.445	0.346	0.344	0.591
Departure Headway (Hd)	6.184	6.822	6.697	6.805	6.297
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	583	526	536	528	571
Service Time	4.234	4.574	4.449	4.557	4.049
HCM Lane V/C Ratio	0.479	0.447	0.347	0.345	0.592
HCM Control Delay	14.8	15	13	13.1	17.8
HCM Lane LOS	B	B	B	B	C
HCM 95th-tile Q	2.6	2.3	1.5	1.5	3.8

Intersection	
Intersection Delay, s/veh	23.7
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	288	61	57	644	203	224
Future Vol, veh/h	288	61	57	644	203	224
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	306	65	61	685	216	238
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	22.9	28.7	16
HCM LOS	C	D	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	21%	0%
Vol Thru, %	0%	0%	83%	79%	100%
Vol Right, %	0%	100%	17%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	203	224	349	272	429
LT Vol	203	0	0	57	0
Through Vol	0	0	288	215	429
RT Vol	0	224	61	0	0
Lane Flow Rate	216	238	371	289	457
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.472	0.44	0.683	0.543	0.844
Departure Headway (Hd)	7.875	6.647	6.618	6.76	6.653
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	456	539	546	532	544
Service Time	5.647	4.418	4.683	4.533	4.426
HCM Lane V/C Ratio	0.474	0.442	0.679	0.543	0.84
HCM Control Delay	17.6	14.6	22.9	17.4	35.9
HCM Lane LOS	C	B	C	C	E
HCM 95th-tile Q	2.5	2.2	5.2	3.2	8.8

Intersection	
Intersection Delay, s/veh	17
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Vol, veh/h	390	88	31	545	107	49
Future Vol, veh/h	390	88	31	545	107	49
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	480	108	38	671	132	60
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.6	20.1	13
HCM LOS	B	C	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	69%	0%	0%	15%	0%
Vol Thru, %	0%	100%	60%	85%	100%
Vol Right, %	31%	0%	40%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	156	260	218	213	363
LT Vol	107	0	0	31	0
Through Vol	0	260	130	182	363
RT Vol	49	0	88	0	0
Lane Flow Rate	192	320	268	262	447
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.347	0.545	0.435	0.439	0.741
Departure Headway (Hd)	6.505	6.128	5.841	6.042	5.968
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	553	589	614	594	604
Service Time	4.548	3.876	3.589	3.787	3.713
HCM Lane V/C Ratio	0.347	0.543	0.436	0.441	0.74
HCM Control Delay	13	16	13	13.5	23.9
HCM Lane LOS	B	C	B	B	C
HCM 95th-tile Q	1.5	3.3	2.2	2.2	6.4

Intersection												
Int Delay, s/veh	8.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Vol, veh/h	0	0	200	27	0	49	211	478	50	86	434	13
Future Vol, veh/h	0	0	200	27	0	49	211	478	50	86	434	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	213	29	0	52	224	509	53	91	462	14

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	1654	462	1742	1642	536	476	0	0	562	0	0
Stage 1	-	644	-	984	984	-	-	-	-	-	-	-
Stage 2	-	1010	-	758	658	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	98	600	68	100	545	1086	-	-	1009	-	-
Stage 1	0	468	-	299	327	-	-	-	-	-	-	-
Stage 2	0	317	-	399	461	-	-	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	71	600	34	72	545	1086	-	-	1009	-	-
Mov Cap-2 Maneuver	-	71	-	34	72	-	-	-	-	-	-	-
Stage 1	-	426	-	237	260	-	-	-	-	-	-	-
Stage 2	-	252	-	234	420	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.3		107.3		2.6		1.4	
HCM LOS	B		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1086	-	-	600	34	545	1009	-	-
HCM Lane V/C Ratio	0.207	-	-	0.355	0.845	0.096	0.091	-	-
HCM Control Delay (s)	9.2	-	-	14.3	279.6	12.3	8.9	-	-
HCM Lane LOS	A	-	-	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	1.6	3	0.3	0.3	-	-

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	68	71	41	674	618	34
Future Vol, veh/h	68	71	41	674	618	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	70	73	42	695	637	35

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1434	336	672	0	-	0
Stage 1	655	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	136	661	917	-	-	-
Stage 1	480	-	-	-	-	-
Stage 2	451	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	130	661	917	-	-	-
Mov Cap-2 Maneuver	329	-	-	-	-	-
Stage 1	458	-	-	-	-	-
Stage 2	451	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	917	-	329	661	-	-
HCM Lane V/C Ratio	0.046	-	0.213	0.111	-	-
HCM Control Delay (s)	9.1	-	18.9	11.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	0.4	-	-



Intersection	
Intersection Delay, s/veh	20.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	33	33	10	17	25	85	12	358	24	127	440	26
Future Vol, veh/h	33	33	10	17	25	85	12	358	24	127	440	26
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	35	11	18	27	90	13	381	26	135	468	28
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11.3	11.5	20.6	23.9
HCM LOS	B	B	C	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	43%	13%	100%	0%
Vol Thru, %	0%	94%	43%	20%	0%	94%
Vol Right, %	0%	6%	13%	67%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	382	76	127	127	466
LT Vol	12	0	33	17	127	0
Through Vol	0	358	33	25	0	440
RT Vol	0	24	10	85	0	26
Lane Flow Rate	13	406	81	135	135	496
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.023	0.682	0.156	0.239	0.237	0.796
Departure Headway (Hd)	6.592	6.04	6.924	6.367	6.327	5.78
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	541	597	514	559	566	625
Service Time	4.357	3.805	5.018	4.453	4.084	3.537
HCM Lane V/C Ratio	0.024	0.68	0.158	0.242	0.239	0.794
HCM Control Delay	9.5	20.9	11.3	11.5	11.1	27.4
HCM Lane LOS	A	C	B	B	B	D
HCM 95th-tile Q	0.1	5.3	0.5	0.9	0.9	7.8

Intersection						
Int Delay, s/veh	19.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	81	205	186	276	337	108
Future Vol, veh/h	81	205	186	276	337	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	225	204	303	370	119

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	204	0	-	0	607
Stage 1	-	-	-	-	204
Stage 2	-	-	-	-	403
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1368	-	-	0	460
Stage 1	-	-	-	0	830
Stage 2	-	-	-	0	675
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1368	-	-	-	430
Mov Cap-2 Maneuver	-	-	-	-	430
Stage 1	-	-	-	-	776
Stage 2	-	-	-	-	675

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	38.1
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1368	-	-	430	837
HCM Lane V/C Ratio	0.065	-	-	0.861	0.142
HCM Control Delay (s)	7.8	-	-	47.1	10
HCM Lane LOS	A	-	-	E	B
HCM 95th %tile Q(veh)	0.2	-	-	8.6	0.5

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	9	1	362	457	10
Future Vol, veh/h	32	9	1	362	457	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	9	1	381	481	11

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	870	487	492	0	-	0
Stage 1	487	-	-	-	-	-
Stage 2	383	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	322	581	1071	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	689	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	322	581	1071	-	-	-
Mov Cap-2 Maneuver	512	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1071	-	526	-	-
HCM Lane V/C Ratio	0.001	-	0.082	-	-
HCM Control Delay (s)	8.4	-	12.5	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	66	0	0	63	0	10
Future Vol, veh/h	66	0	0	63	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	72	0	0	68	0	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	72	0	140
Stage 1	-	-	-	-	72
Stage 2	-	-	-	-	68
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1528	-	853
Stage 1	-	-	-	-	951
Stage 2	-	-	-	-	955
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1528	-	853
Mov Cap-2 Maneuver	-	-	-	-	853
Stage 1	-	-	-	-	951
Stage 2	-	-	-	-	955

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	990	-	-	1528	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	28.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Vol, veh/h	303	120	12	400	245	37
Future Vol, veh/h	303	120	12	400	245	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	379	150	15	500	306	46

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	529	0	909
Stage 1	-	-	-	-	379
Stage 2	-	-	-	-	530
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1038	-	~ 305
Stage 1	-	-	-	-	692
Stage 2	-	-	-	-	590
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1038	-	~ 301
Mov Cap-2 Maneuver	-	-	-	-	~ 301
Stage 1	-	-	-	-	692
Stage 2	-	-	-	-	582

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	112.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	324	-	-	1038	-
HCM Lane V/C Ratio	1.088	-	-	0.014	-
HCM Control Delay (s)	112.3	-	-	8.5	-
HCM Lane LOS	F	-	-	A	-
HCM 95th %tile Q(veh)	13.4	-	-	0	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	14.3
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↔		↕	↕
Traffic Vol, veh/h	212	115	214	70	107	208
Future Vol, veh/h	212	115	214	70	107	208
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	249	135	252	82	126	245
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	16.8	13.9	12
HCM LOS	C	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	65%	0%	100%	0%
Vol Thru, %	35%	75%	0%	0%
Vol Right, %	0%	25%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	327	284	107	208
LT Vol	212	0	107	0
Through Vol	115	214	0	0
RT Vol	0	70	0	208
Lane Flow Rate	385	334	126	245
Geometry Grp	2	2	7	7
Degree of Util (X)	0.6	0.504	0.243	0.39
Departure Headway (Hd)	5.615	5.434	6.958	5.738
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	642	662	516	626
Service Time	3.657	3.479	4.703	3.482
HCM Lane V/C Ratio	0.6	0.505	0.244	0.391
HCM Control Delay	16.8	13.9	11.9	12.1
HCM Lane LOS	C	B	B	B
HCM 95th-tile Q	4	2.8	0.9	1.8

**Intersection**







Intersection Delay, s/veh 15.7  
 Intersection LOS C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	144	186	127	172	179	179
Future Vol, veh/h	144	186	127	172	179	179
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	173	224	153	207	216	216
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	17.9	17.5	12.1
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	42%	44%	0%	0%
Vol Thru, %	58%	0%	100%	0%
Vol Right, %	0%	56%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	299	330	179	179
LT Vol	127	144	0	0
Through Vol	172	0	179	0
RT Vol	0	186	0	179
Lane Flow Rate	360	398	216	216
Geometry Grp	5	2	7	7
Degree of Util (X)	0.596	0.627	0.378	0.335
Departure Headway (Hd)	5.954	5.68	6.307	5.594
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	632	569	641
Service Time	4.014	3.739	4.071	3.358
HCM Lane V/C Ratio	0.595	0.63	0.38	0.337
HCM Control Delay	17.5	17.9	12.9	11.2
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	3.9	4.4	1.8	1.5

Queues  
24: Brunswick Rd & Loma Rica Dr

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	192	342	454	82	180	470
v/c Ratio	0.59	0.40	0.75	0.14	0.52	0.42
Control Delay	33.8	5.7	27.2	4.9	29.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	5.7	27.2	4.9	29.7	6.9
Queue Length 50th (ft)	64	22	144	0	60	76
Queue Length 95th (ft)	#160	81	284	26	135	129
Internal Link Dist (ft)	995		923			643
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	419	1038	945	842	591	1588
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.33	0.48	0.10	0.30	0.30













Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project 1530  
 To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	177	315	418	75	166	432
Future Volume (veh/h)	177	315	418	75	166	432
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	192	342	454	82	180	470
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	404	568	579	491	235	1012
Arrive On Green	0.23	0.23	0.32	0.32	0.13	0.55
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	192	342	454	82	180	470
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	4.8	9.0	11.3	1.9	5.0	7.7
Cycle Q Clear(g_c), s	4.8	9.0	11.3	1.9	5.0	7.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	404	568	579	491	235	1012
V/C Ratio(X)	0.48	0.60	0.78	0.17	0.77	0.46
Avail Cap(c_a), veh/h	490	645	1101	933	691	1794
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	12.9	15.5	12.3	20.9	6.7
Incr Delay (d2), s/veh	0.9	1.3	2.4	0.2	5.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.8	4.0	0.5	2.0	1.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.5	14.1	17.9	12.5	26.1	7.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	534		536			650
Approach Delay, s/veh	15.3		17.1			12.3
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.9	21.7			33.5	16.5
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	7.0	13.3			9.7	11.0
Green Ext Time (p_c), s	0.4	2.6			2.9	0.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.7			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	8.0	15.0	5.2	8.6

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	1.0	0.0	0.5
Total Del/Veh (s)	5.6	7.8	12.9	8.6

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.4	0.3
Total Del/Veh (s)	9.9	9.4	1.6	6.4

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.6	2.1	1.1
Total Del/Veh (s)	18.3	9.5	15.9	16.1	13.5

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.7
Total Del/Veh (s)	14.4	14.4	19.3	37.4	20.3

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.7	9.5	27.7	14.0

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.4
Total Del/Veh (s)	16.6	32.9	27.8	11.2	22.1

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	2.7	0.9
Total Del/Veh (s)	13.4	14.3	13.2	13.7

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	2.9	0.0	0.2	1.3
Total Del/Veh (s)	19.0	11.6	15.6	15.6

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Total Zone Performance

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Denied Del/Veh (s)	1.4
Total Del/Veh (s)	683.6

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	99	179	86	107
Average Queue (ft)	62	77	42	41
95th Queue (ft)	103	138	76	80
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	3			
Queuing Penalty (veh)	8			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	117	94	137	115	100
Average Queue (ft)	65	30	63	61	51
95th Queue (ft)	104	67	109	103	87
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			2	1
Queuing Penalty (veh)	0			2	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	1		
Queuing Penalty (veh)		0	2		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	142	131	47	66	31
Average Queue (ft)	70	56	16	36	3
95th Queue (ft)	115	95	43	56	18
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	47	104	105	163	29	194	139	191	213	144
Average Queue (ft)	14	47	49	80	2	89	66	64	109	61
95th Queue (ft)	41	87	88	149	17	159	126	143	177	116
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)				0						
Queuing Penalty (veh)				1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						3	1			
Queuing Penalty (veh)						6	2			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	173	188	102	184	173	110	164	208	226	70	91
Average Queue (ft)	98	133	66	70	94	31	72	105	135	24	44
95th Queue (ft)	181	204	104	157	168	75	129	186	199	58	76
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	6	2	4	6						
Queuing Penalty (veh)	2	20	0	16	23						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	4		0	4	0	0		
Queuing Penalty (veh)			7	5		1	1	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	154	165	199	272	104	216	234	455
Average Queue (ft)	54	58	58	84	4	142	172	101
95th Queue (ft)	116	123	148	200	60	226	259	327
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	13	26	
Queuing Penalty (veh)				0	0	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	134	153	187	229	191	183	264	342	221	283	222	138
Average Queue (ft)	60	79	97	110	93	83	117	192	89	162	84	57
95th Queue (ft)	112	128	159	180	161	147	209	296	192	251	161	105
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)			0	0	0	2	6		0	0	0	
Queuing Penalty (veh)			0	0	0	7	8		0	1	0	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	102
Average Queue (ft)	46
95th Queue (ft)	89
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	199	219	143	147	162	116	145	133
Average Queue (ft)	86	94	61	54	72	42	58	53
95th Queue (ft)	157	185	112	108	133	87	113	99
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	0	3						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			0	0			0	
Queuing Penalty (veh)			1	0			0	

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	473	180	204	120	115	172	73
Average Queue (ft)	176	105	107	40	37	93	33
95th Queue (ft)	374	196	179	92	90	151	57
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)	1		0				
Queuing Penalty (veh)	0		1				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	9	1					
Queuing Penalty (veh)	34	5					

Zone Summary

Zone wide Queuing Penalty: 159



# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project 1530-1630 PM

To SR 49

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	59	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.7
8	T1	54	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.6
18	R2	86	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	32.7
Approach		200	3.0	0.224	6.3	LOS A	1.0	25.7	0.53	0.45	0.53	33.2
East: Idaho Maryland Rd												
1	L2	343	3.0	0.331	6.9	LOS A	1.6	40.4	0.49	0.40	0.49	31.7
6	T1	214	3.0	0.406	7.8	LOS A	2.1	53.3	0.53	0.43	0.53	33.6
16	R2	208	3.0	0.406	7.8	LOS A	2.1	53.3	0.53	0.43	0.53	32.6
Approach		765	3.0	0.406	7.4	LOS A	2.1	53.3	0.51	0.42	0.51	32.5
North: Main St												
7	L2	92	3.0	0.400	9.4	LOS A	2.0	50.6	0.63	0.68	0.77	32.3
4	T1	230	3.0	0.400	9.4	LOS A	2.0	50.6	0.63	0.68	0.77	32.2
14	R2	310	3.0	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		632	3.0	0.400	4.8	LOS A	2.0	50.6	0.32	0.35	0.39	34.5
West: Main St												
5	L2	194	3.0	0.437	10.4	LOS B	2.3	59.5	0.66	0.74	0.89	31.1
2	T1	102	3.0	0.437	10.4	LOS B	2.3	59.5	0.66	0.74	0.89	31.1
12	R2	41	3.0	0.437	10.4	LOS B	2.3	59.5	0.66	0.74	0.89	30.3
Approach		336	3.0	0.437	10.4	LOS B	2.3	59.5	0.66	0.74	0.89	31.0
All Vehicles		1933	3.0	0.437	7.0	LOS A	2.3	59.5	0.48	0.45	0.54	32.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\21-25 EPAPPP To SR 49\5.4 EPAPPP To SR 49 1530 PM Idaho Main.sjp8

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Vol, veh/h	28	181	5	0	0	0	0	62	62	115	200	0
Future Vol, veh/h	28	181	5	0	0	0	0	62	62	115	200	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	201	6	0	0	0	0	69	69	128	222	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10	9.7	10.5
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	24%	0%	100%	0%
Vol Thru, %	50%	76%	95%	0%	100%
Vol Right, %	50%	0%	5%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	124	119	96	115	200
LT Vol	0	28	0	115	0
Through Vol	62	91	91	0	200
RT Vol	62	0	5	0	0
Lane Flow Rate	138	132	106	128	222
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.203	0.215	0.168	0.207	0.329
Departure Headway (Hd)	5.304	5.866	5.71	5.839	5.335
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	672	608	624	612	671
Service Time	3.376	3.638	3.482	3.603	3.1
HCM Lane V/C Ratio	0.205	0.217	0.17	0.209	0.331
HCM Control Delay	9.7	10.3	9.6	10.1	10.7
HCM Lane LOS	A	B	A	B	B
HCM 95th-tile Q	0.8	0.8	0.6	0.8	1.4

<b>Intersection</b>						
Intersection Delay, s/veh	10.3					
Intersection LOS	B					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	111	35	21	295	82	122
Future Vol, veh/h	111	35	21	295	82	122
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	134	42	25	355	99	147
Number of Lanes	1	0	0	2	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	2
HCM Control Delay	10.2	10.6	9.8
HCM LOS	B	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2
Vol Left, %	100%	0%	0%	18%	0%
Vol Thru, %	0%	0%	76%	82%	100%
Vol Right, %	0%	100%	24%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	82	122	146	119	197
LT Vol	82	0	0	21	0
Through Vol	0	0	111	98	197
RT Vol	0	122	35	0	0
Lane Flow Rate	99	147	176	144	237
Geometry Grp	7	7	4	7	7
Degree of Util (X)	0.175	0.211	0.258	0.218	0.354
Departure Headway (Hd)	6.384	5.173	5.285	5.465	5.377
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	558	688	674	653	663
Service Time	4.165	2.953	3.363	3.236	3.148
HCM Lane V/C Ratio	0.177	0.214	0.261	0.221	0.357
HCM Control Delay	10.5	9.4	10.2	9.8	11.1
HCM Lane LOS	B	A	B	A	B
HCM 95th-tile Q	0.6	0.8	1	0.8	1.6

Intersection	
Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Vol, veh/h	216	8	2	266	27	12
Future Vol, veh/h	216	8	2	266	27	12
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	253	9	2	311	32	14
Number of Lanes	2	0	0	2	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	2
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	2
HCM Control Delay	8.8	9.1	8.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2
Vol Left, %	69%	0%	0%	2%	0%
Vol Thru, %	0%	100%	90%	98%	100%
Vol Right, %	31%	0%	10%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	144	80	91	177
LT Vol	27	0	0	2	0
Through Vol	0	144	72	89	177
RT Vol	12	0	8	0	0
Lane Flow Rate	46	169	94	106	208
Geometry Grp	2	7	7	7	7
Degree of Util (X)	0.065	0.23	0.126	0.144	0.281
Departure Headway (Hd)	5.14	4.913	4.843	4.88	4.869
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	697	733	743	737	741
Service Time	3.168	2.63	2.559	2.595	2.584
HCM Lane V/C Ratio	0.066	0.231	0.127	0.144	0.281
HCM Control Delay	8.5	9.1	8.3	8.4	9.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.2	0.9	0.4	0.5	1.2

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻	↻	↻	↻		↻	↻	↻
Traffic Vol, veh/h	0	0	139	22	0	36	104	214	26	63	284	1
Future Vol, veh/h	0	0	139	22	0	36	104	214	26	63	284	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	550	-	-	120	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	154	24	0	40	116	238	29	70	316	1

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	-	955	316	1019	942	253	317	0	0	267	0	0
Stage 1	-	456	-	485	485	-	-	-	-	-	-	-
Stage 2	-	499	-	534	457	-	-	-	-	-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	258	724	215	263	786	1243	-	-	1297	-	-
Stage 1	0	568	-	563	552	-	-	-	-	-	-	-
Stage 2	0	544	-	530	568	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	221	724	151	226	786	1243	-	-	1297	-	-
Mov Cap-2 Maneuver	-	221	-	151	226	-	-	-	-	-	-	-
Stage 1	-	537	-	511	501	-	-	-	-	-	-	-
Stage 2	-	493	-	394	537	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.3		18.8		2.5		1.4	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1243	-	-	724	151	786	1297	-	-
HCM Lane V/C Ratio	0.093	-	-	0.213	0.162	0.051	0.054	-	-
HCM Control Delay (s)	8.2	-	-	11.3	33.4	9.8	7.9	-	-
HCM Lane LOS	A	-	-	B	D	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	0.6	0.2	0.2	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Vol, veh/h	19	33	8	321	440	13
Future Vol, veh/h	19	33	8	321	440	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	38	9	373	512	15

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	911	264	527	0	-	0
Stage 1	520	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	289	735	1038	-	-	-
Stage 1	562	-	-	-	-	-
Stage 2	683	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	286	735	1038	-	-	-
Mov Cap-2 Maneuver	473	-	-	-	-	-
Stage 1	557	-	-	-	-	-
Stage 2	683	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1038	-	473	735	-	-
HCM Lane V/C Ratio	0.009	-	0.047	0.052	-	-
HCM Control Delay (s)	8.5	-	13	10.2	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	22	26	10	11	17	43	11	220	12	89	328	17
Future Vol, veh/h	22	26	10	11	17	43	11	220	12	89	328	17
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	30	11	13	20	49	13	253	14	102	377	20
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.7	9.4	11.7	13.7
HCM LOS	A	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	38%	15%	100%	0%
Vol Thru, %	0%	95%	45%	24%	0%	95%
Vol Right, %	0%	5%	17%	61%	0%	5%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	232	58	71	89	345
LT Vol	11	0	22	11	89	0
Through Vol	0	220	26	17	0	328
RT Vol	0	12	10	43	0	17
Lane Flow Rate	13	267	67	82	102	397
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.021	0.4	0.11	0.127	0.162	0.57
Departure Headway (Hd)	6.041	5.4	5.952	5.616	5.71	5.172
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	596	659	605	642	622	690
Service Time	3.741	3.199	3.955	3.619	3.498	2.959
HCM Lane V/C Ratio	0.022	0.405	0.111	0.128	0.164	0.575
HCM Control Delay	8.9	11.8	9.7	9.4	9.6	14.7
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0.1	1.9	0.4	0.4	0.6	3.6

Intersection						
Int Delay, s/veh	7.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	27	134	79	171	239	47
Future Vol, veh/h	27	134	79	171	239	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	151	89	192	269	53

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	89	0	-	0	300 89
Stage 1	-	-	-	-	89 -
Stage 2	-	-	-	-	211 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1506	-	-	0	691 969
Stage 1	-	-	-	0	934 -
Stage 2	-	-	-	0	824 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1506	-	-	-	677 969
Mov Cap-2 Maneuver	-	-	-	-	677 -
Stage 1	-	-	-	-	915 -
Stage 2	-	-	-	-	824 -

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1506	-	-	677	969
HCM Lane V/C Ratio	0.02	-	-	0.397	0.054
HCM Control Delay (s)	7.4	-	-	13.8	8.9
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.9	0.2



Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	14	14	189	285	64
Future Vol, veh/h	54	14	14	189	285	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	16	16	220	331	74

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	620	368	405	0	-	0
Stage 1	368	-	-	-	-	-
Stage 2	252	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	452	677	1154	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	790	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	446	677	1154	-	-	-
Mov Cap-2 Maneuver	602	-	-	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	790	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.7	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1154	-	616	-	-
HCM Lane V/C Ratio	0.014	-	0.128	-	-
HCM Control Delay (s)	8.2	-	11.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	0	0	45	0	10
Future Vol, veh/h	48	0	0	45	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	0	0	49	0	11

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	52	0	101
Stage 1	-	-	-	-	52
Stage 2	-	-	-	-	49
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1554	-	898
Stage 1	-	-	-	-	970
Stage 2	-	-	-	-	973
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1554	-	898
Mov Cap-2 Maneuver	-	-	-	-	898
Stage 1	-	-	-	-	970
Stage 2	-	-	-	-	973

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1016	-	-	1554	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	1.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↙
Traffic Vol, veh/h	122	34	3	122	35	11
Future Vol, veh/h	122	34	3	122	35	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	175	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	172	48	4	172	49	15

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	220	0	352 172
Stage 1	-	-	-	-	172 -
Stage 2	-	-	-	-	180 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1349	-	646 872
Stage 1	-	-	-	-	858 -
Stage 2	-	-	-	-	851 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1349	-	644 872
Mov Cap-2 Maneuver	-	-	-	-	644 -
Stage 1	-	-	-	-	858 -
Stage 2	-	-	-	-	848 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	687	-	-	1349	-
HCM Lane V/C Ratio	0.094	-	-	0.003	-
HCM Control Delay (s)	10.8	-	-	7.7	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↗		↖	↗
Traffic Vol, veh/h	68	58	52	25	29	66
Future Vol, veh/h	68	58	52	25	29	66
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	88	79	38	44	100
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	9	8	8.2
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	54%	0%	100%	0%
Vol Thru, %	46%	68%	0%	0%
Vol Right, %	0%	32%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	77	29	66
LT Vol	68	0	29	0
Through Vol	58	52	0	0
RT Vol	0	25	0	66
Lane Flow Rate	191	117	44	100
Geometry Grp	2	2	7	7
Degree of Util (X)	0.24	0.139	0.07	0.126
Departure Headway (Hd)	4.517	4.303	5.734	4.527
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	796	834	626	793
Service Time	2.535	2.323	3.458	2.251
HCM Lane V/C Ratio	0.24	0.14	0.07	0.126
HCM Control Delay	9	8	8.9	7.9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.5	0.2	0.4

**Intersection**







Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	86	135	47	62	50	64
Future Vol, veh/h	86	135	47	62	50	64
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	115	180	63	83	67	85
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right		NB	EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.8	9.3	8.3
HCM LOS	A	A	A













Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	43%	39%	0%	0%
Vol Thru, %	57%	0%	100%	0%
Vol Right, %	0%	61%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	109	221	50	64
LT Vol	47	86	0	0
Through Vol	62	0	50	0
RT Vol	0	135	0	64
Lane Flow Rate	145	295	67	85
Geometry Grp	5	2	7	7
Degree of Util (X)	0.201	0.357	0.099	0.11
Departure Headway (Hd)	4.978	4.358	5.355	4.649
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	718	825	667	768
Service Time	3.025	2.389	3.103	2.397
HCM Lane V/C Ratio	0.202	0.358	0.1	0.111
HCM Control Delay	9.3	9.8	8.7	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	1.6	0.3	0.4

Queues  
24: Brunswick Rd & Loma Rica Dr

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	54	296	25	111	439
v/c Ratio	0.10	0.08	0.38	0.04	0.22	0.30
Control Delay	17.9	3.3	12.9	6.2	16.3	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	3.3	12.9	6.2	16.3	3.4
Queue Length 50th (ft)	6	0	33	0	14	0
Queue Length 95th (ft)	38	14	137	13	68	95
Internal Link Dist (ft)	1001		901			633
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	869	1141	1493	1273	1085	1804
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.05	0.20	0.02	0.10	0.24
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

EPAP plus Project 1830  
 To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	50	272	23	102	404
Future Volume (veh/h)	42	50	272	23	102	404
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	46	54	296	25	111	439
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	165	303	493	418	176	992
Arrive On Green	0.09	0.09	0.27	0.27	0.10	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	46	54	296	25	111	439
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.7	0.9	4.2	0.4	1.8	4.3
Cycle Q Clear(g_c), s	0.7	0.9	4.2	0.4	1.8	4.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	165	303	493	418	176	992
V/C Ratio(X)	0.28	0.18	0.60	0.06	0.63	0.44
Avail Cap(c_a), veh/h	829	894	1864	1580	1170	3037
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	9.9	9.4	8.0	12.8	4.1
Incr Delay (d2), s/veh	0.9	0.3	1.2	0.1	3.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.2	1.0	0.1	0.6	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.4	10.2	10.6	8.1	16.5	4.4
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	100		321			550
Approach Delay, s/veh	11.6		10.4			6.8
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.1	13.8			21.9	7.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	3.8	6.2			6.3	2.9
Green Ext Time (p_c), s	0.2	1.6			2.7	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.5			
HCM 6th LOS			A			





1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	6.3	11.2	4.8	6.8

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	1.3	0.0	0.5
Total Del/Veh (s)	5.2	6.5	10.5	7.0

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.2
Total Del/Veh (s)	6.4	7.9	1.0	4.1

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.4	2.1	1.1
Total Del/Veh (s)	17.7	6.5	10.8	10.0	9.0

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.9	0.7
Total Del/Veh (s)	8.3	12.6	13.2	35.7	16.4

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.2	4.7	22.0	8.8

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.6	0.0	0.4
Total Del/Veh (s)	8.7	15.7	13.1	3.7	9.6

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.5	2.7	1.1
Total Del/Veh (s)	9.8	9.7	5.9	8.4

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23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

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Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.7	0.0	0.1	0.6
Total Del/Veh (s)	6.3	7.6	8.3	7.3

---

Total Zone Performance

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Denied Del/Veh (s)	1.2
Total Del/Veh (s)	188.5

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	98	115	77	83
Average Queue (ft)	55	47	30	30
95th Queue (ft)	94	89	61	61
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	4			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	115	58	91	85	71
Average Queue (ft)	62	22	39	43	32
95th Queue (ft)	100	52	76	75	63
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	87	74	31	52	15
Average Queue (ft)	45	36	9	29	1
95th Queue (ft)	71	59	32	45	7
Link Distance (ft)	1196	1196		262	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	42	56	70	96	7	104	78	97	119	85
Average Queue (ft)	15	22	32	34	0	46	30	23	60	30
95th Queue (ft)	40	47	60	74	5	86	59	62	99	65
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						0	0			
Queuing Penalty (veh)						0	0			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	132	159	93	114	120	64	100	132	164	54	64
Average Queue (ft)	37	64	48	28	42	20	48	44	88	15	30
95th Queue (ft)	94	128	85	81	100	52	83	103	143	42	54
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	1	1						
Queuing Penalty (veh)	0	0	0	1	1						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	1		0	0				
Queuing Penalty (veh)			1	0		0	0				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	61	73	40	89	192	128	14
Average Queue (ft)	11	19	5	9	105	58	1
95th Queue (ft)	40	54	26	49	172	99	13
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					3	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	68	73	96	99	105	82	86	123	61	131	104	67
Average Queue (ft)	19	33	39	52	51	36	40	62	20	67	39	27
95th Queue (ft)	49	63	79	87	86	67	74	108	49	111	78	56
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	72
Average Queue (ft)	26
95th Queue (ft)	63
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	88	121	58	65	68	61	70	73
Average Queue (ft)	31	45	24	23	25	18	27	28
95th Queue (ft)	65	92	51	50	52	47	59	54
Link Distance (ft)	211	211		1564	1564		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	84	47	101	66	66	80	57
Average Queue (ft)	36	21	44	22	15	37	26
95th Queue (ft)	70	41	84	53	46	69	49
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 8
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# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

EPAP plus Project 830-1930 PM

To SR 49

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	40	3.0	0.094	4.5	LOS A	0.4	10.0	0.43	0.30	0.43	34.2
8	T1	37	3.0	0.094	4.5	LOS A	0.4	10.0	0.43	0.30	0.43	34.2
18	R2	14	3.0	0.094	4.5	LOS A	0.4	10.0	0.43	0.30	0.43	33.2
Approach		92	3.0	0.094	4.5	LOS A	0.4	10.0	0.43	0.30	0.43	34.0
East: Idaho Maryland Rd												
1	L2	179	3.0	0.162	4.7	LOS A	0.7	17.3	0.37	0.25	0.37	32.6
6	T1	168	3.0	0.236	5.4	LOS A	1.1	27.0	0.40	0.28	0.40	34.9
16	R2	93	3.0	0.236	5.4	LOS A	1.1	27.0	0.40	0.28	0.40	33.8
Approach		439	3.0	0.236	5.1	LOS A	1.1	27.0	0.39	0.27	0.39	33.7
North: Main St												
7	L2	54	3.0	0.213	5.7	LOS A	0.8	21.6	0.46	0.39	0.46	34.2
4	T1	156	3.0	0.213	5.7	LOS A	0.8	21.6	0.46	0.39	0.46	34.1
14	R2	210	3.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		419	3.0	0.213	2.9	LOS A	0.8	21.6	0.23	0.19	0.23	35.6
West: Main St												
5	L2	160	3.0	0.273	6.4	LOS A	1.1	29.1	0.48	0.42	0.48	32.9
2	T1	85	3.0	0.273	6.4	LOS A	1.1	29.1	0.48	0.42	0.48	32.8
12	R2	24	3.0	0.273	6.4	LOS A	1.1	29.1	0.48	0.42	0.48	31.9
Approach		268	3.0	0.273	6.4	LOS A	1.1	29.1	0.48	0.42	0.48	32.8
All Vehicles		1218	3.0	0.273	4.6	LOS A	1.1	29.1	0.36	0.28	0.36	34.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\21-25 EPAPPP To SR 49\5.5 EPAPPP To SR 49 1830 PM Idaho Main.sjp8





Intersection	
Intersection Delay, s/veh	33.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	76	348	4	0	0	0	0	210	302	166	250	0
Future Vol, veh/h	76	348	4	0	0	0	0	210	302	166	250	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	83	378	4	0	0	0	0	228	328	180	272	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	17.7	59.7	16.6
HCM LOS	C	F	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	30%	0%	100%	0%
Vol Thru, %	41%	70%	98%	0%	100%
Vol Right, %	59%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	512	250	178	166	250
LT Vol	0	76	0	166	0
Through Vol	210	174	174	0	250
RT Vol	302	0	4	0	0
Lane Flow Rate	557	272	193	180	272
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.985	0.565	0.393	0.382	0.536
Departure Headway (Hd)	6.371	7.481	7.309	7.615	7.102
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	568	478	489	476	511
Service Time	4.458	5.28	5.108	5.315	4.802
HCM Lane V/C Ratio	0.981	0.569	0.395	0.378	0.532
HCM Control Delay	59.7	19.7	14.8	14.9	17.7
HCM Lane LOS	F	C	B	B	C
HCM 95th-tile Q	13.8	3.4	1.8	1.8	3.1

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative AM Peak  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	324	42	58	375	255	513
Future Volume (veh/h)	324	42	58	375	255	513
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	348	45	62	403	274	552
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	424	55	90	617	571	818
Arrive On Green	0.26	0.26	0.20	0.20	0.32	0.32
Sat Flow, veh/h	1623	210	461	3256	1781	1585
Grp Volume(v), veh/h	0	393	248	217	274	552
Grp Sat Flow(s),veh/h/ln	0	1833	1847	1777	1781	1585
Q Serve(g_s), s	0.0	12.7	7.9	7.1	7.8	16.3
Cycle Q Clear(g_c), s	0.0	12.7	7.9	7.1	7.8	16.3
Prop In Lane		0.11	0.25		1.00	1.00
Lane Grp Cap(c), veh/h	0	478	360	347	571	818
V/C Ratio(X)	0.00	0.82	0.69	0.63	0.48	0.68
Avail Cap(c_a), veh/h	0	734	740	711	713	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	22.0	23.6	23.3	17.2	11.4
Incr Delay (d2), s/veh	0.0	4.5	2.4	1.9	0.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0	0.0	5.6	3.5	3.0	3.0	8.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	26.4	26.0	25.2	17.9	12.9
LnGrp LOS	A	C	C	C	B	B
Approach Vol, veh/h	393			465	826	
Approach Delay, s/veh	26.4			25.6	14.6	
Approach LOS	C			C	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		25.0		21.2		17.0
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		18.3		14.7		9.9
Green Ext Time (p_c), s		1.9		1.8		2.4

Intersection Summary

HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative AM Peak  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	683	139	26	366	84	30
Future Volume (veh/h)	683	139	26	366	84	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	719	146	27	385	88	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	1132	230	46	685	130	47
Arrive On Green	0.38	0.38	0.20	0.20	0.10	0.10
Sat Flow, veh/h	3036	597	228	3502	1255	456
Grp Volume(v), veh/h	434	431	221	191	121	0
Grp Sat Flow(s),veh/h/ln	1777	1763	1859	1777	1725	0
Q Serve(g_s), s	9.0	9.0	4.8	4.3	3.0	0.0
Cycle Q Clear(g_c), s	9.0	9.0	4.8	4.3	3.0	0.0
Prop In Lane		0.34	0.12		0.73	0.26
Lane Grp Cap(c), veh/h	683	678	374	357	179	0
V/C Ratio(X)	0.64	0.64	0.59	0.54	0.68	0.00
Avail Cap(c_a), veh/h	1589	1576	1044	997	398	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.3	11.3	16.3	16.1	19.5	0.0
Incr Delay (d2), s/veh	1.0	1.0	1.5	1.3	4.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	2.9	1.9	1.7	1.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.3	12.3	17.8	17.4	23.8	0.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	865			412	121	
Approach Delay, s/veh	12.3			17.6	23.8	
Approach LOS	B			B	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		9.3		22.0		13.8
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		10.4		* 40		25.3
Max Q Clear Time (g_c+l1), s		5.0		11.0		6.8
Green Ext Time (p_c), s		0.1		6.4		2.3

Intersection Summary

HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative AM Peak  
03/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↖		↖	↕	↖
Traffic Volume (veh/h)	0	9	146	100	95	173	231	479	20	45	426	13
Future Volume (veh/h)	0	9	146	100	95	173	231	479	20	45	426	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	10	155	106	101	184	246	510	21	48	453	14
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	200	437	149	142	252	300	603	25	82	757	23
Arrive On Green	0.00	0.11	0.11	0.16	0.16	0.16	0.17	0.34	0.34	0.05	0.22	0.22
Sat Flow, veh/h	0	1870	1585	934	890	1585	1781	1784	73	1781	3519	109
Grp Volume(v), veh/h	0	10	155	207	0	184	246	0	531	48	228	239
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1824	0	1585	1781	0	1857	1781	1777	1851
Q Serve(g_s), s	0.0	0.3	4.7	6.5	0.0	6.6	8.0	0.0	15.9	1.6	6.9	7.0
Cycle Q Clear(g_c), s	0.0	0.3	4.7	6.5	0.0	6.6	8.0	0.0	15.9	1.6	6.9	7.0
Prop In Lane	0.00		1.00	0.51		1.00	1.00		0.04	1.00		0.06
Lane Grp Cap(c), veh/h	0	200	437	290	0	252	300	0	627	82	382	398
V/C Ratio(X)	0.00	0.05	0.35	0.71	0.00	0.73	0.82	0.00	0.85	0.59	0.60	0.60
Avail Cap(c_a), veh/h	0	309	529	453	0	394	442	0	907	205	720	750
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	24.1	17.4	23.9	0.0	24.0	24.1	0.0	18.4	28.1	21.2	21.2
Incr Delay (d2), s/veh	0.0	0.1	0.5	3.2	0.0	4.0	7.5	0.0	5.1	6.5	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr	0.0	0.1	1.6	2.8	0.0	2.5	3.6	0.0	6.5	0.8	2.7	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	24.2	17.9	27.2	0.0	28.0	31.6	0.0	23.6	34.6	22.7	22.7
LnGrp LOS	A	C	B	C	A	C	C	A	C	C	C	C
Approach Vol, veh/h		165			391			777			515	
Approach Delay, s/veh		18.3			27.5			26.1			23.8	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	26.0		11.5	15.2	18.6		14.7				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9	29.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+I), s	13.6	17.9		6.7	10.0	9.0		8.6				
Green Ext Time (p_c), s	0.0	2.4		0.1	0.3	2.1		0.9				

Intersection Summary

HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	47	105	699	460	195
Future Vol, veh/h	33	47	105	699	460	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	51	114	760	500	212

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1594	356	712	0	-	0
Stage 1	606	-	-	-	-	-
Stage 2	988	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	107	641	886	-	-	-
Stage 1	508	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	93	641	886	-	-	-
Mov Cap-2 Maneuver	278	-	-	-	-	-
Stage 1	442	-	-	-	-	-
Stage 2	359	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.7	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	886	-	278	641	-	-
HCM Lane V/C Ratio	0.129	-	0.129	0.08	-	-
HCM Control Delay (s)	9.7	-	19.9	11.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.4	-	0.4	0.3	-	-

Intersection	
Intersection Delay, s/veh	35.4
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	48	22	13	25	48	181	19	513	12	52	203	29
Future Vol, veh/h	48	22	13	25	48	181	19	513	12	52	203	29
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	52	24	14	27	52	195	20	552	13	56	218	31
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	12.2	15.5	59.1	14.5
HCM LOS	B	C	F	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	58%	10%	100%	0%
Vol Thru, %	0%	98%	27%	19%	0%	88%
Vol Right, %	0%	2%	16%	71%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	19	525	83	254	52	232
LT Vol	19	0	48	25	52	0
Through Vol	0	513	22	48	0	203
RT Vol	0	12	13	181	0	29
Lane Flow Rate	20	565	89	273	56	249
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.039	0.993	0.185	0.488	0.114	0.466
Departure Headway (Hd)	6.86	6.334	7.464	6.429	7.331	6.729
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	522	576	479	560	488	534
Service Time	4.601	4.075	5.534	4.478	5.084	4.482
HCM Lane V/C Ratio	0.038	0.981	0.186	0.487	0.115	0.466
HCM Control Delay	9.9	60.9	12.2	15.5	11	15.3
HCM Lane LOS	A	F	B	C	B	C
HCM 95th-tile Q	0.1	14.3	0.7	2.7	0.4	2.4

Intersection						
Int Delay, s/veh	6.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	119	151	275	407	147	105
Future Vol, veh/h	119	151	275	407	147	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	161	293	433	156	112

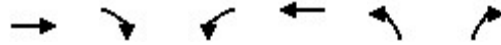
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	293	0	-	0	708 293
Stage 1	-	-	-	-	293 -
Stage 2	-	-	-	-	415 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1269	-	-	0	401 746
Stage 1	-	-	-	0	757 -
Stage 2	-	-	-	0	666 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1269	-	-	-	361 746
Mov Cap-2 Maneuver	-	-	-	-	361 -
Stage 1	-	-	-	-	681 -
Stage 2	-	-	-	-	666 -

Approach	EB	WB	SB
HCM Control Delay, s	3.6	0	17.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1269	-	-	361	746
HCM Lane V/C Ratio	0.1	-	-	0.433	0.15
HCM Control Delay (s)	8.2	-	-	22.4	10.7
HCM Lane LOS	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	2.1	0.5

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative AM Peak  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	201	343	23	224	79	12
Future Volume (veh/h)	201	343	23	224	79	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	207	354	24	231	81	12
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	650	551	65	1033	168	25
Arrive On Green	0.35	0.35	0.04	0.55	0.11	0.11
Sat Flow, veh/h	1870	1585	1781	1870	1512	224
Grp Volume(v), veh/h	207	354	24	231	94	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1754	0
Q Serve(g_s), s	2.3	5.2	0.4	1.8	1.4	0.0
Cycle Q Clear(g_c), s	2.3	5.2	0.4	1.8	1.4	0.0
Prop In Lane		1.00	1.00		0.86	0.13
Lane Grp Cap(c), veh/h	650	551	65	1033	195	0
V/C Ratio(X)	0.32	0.64	0.37	0.22	0.48	0.00
Avail Cap(c_a), veh/h	2029	1719	466	1694	961	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.7	7.7	13.1	3.2	11.7	0.0
Incr Delay (d2), s/veh	0.3	1.3	3.5	0.1	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.2	0.2	0.2	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.0	8.9	16.6	3.3	13.5	0.0
LnGrp LOS	A	A	B	A	B	A
Approach Vol, veh/h	561			255	94	
Approach Delay, s/veh	8.2			4.6	13.5	
Approach LOS	A			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		7.8	5.7	14.4		20.1
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		3.4	2.4	7.2		3.8
Green Ext Time (p_c), s		0.2	0.0	2.5		1.3
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			7.7			
HCM 6th LOS			A			
<b>Notes</b>						
User approved pedestrian interval to be less than phase max green.						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						



Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	117	87	130	133	42	121
Future Vol, veh/h	117	87	130	133	42	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	95	141	145	46	132
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	9.9	9.7	9
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	57%	0%	100%	0%
Vol Thru, %	43%	49%	0%	0%
Vol Right, %	0%	51%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	204	263	42	121
LT Vol	117	0	42	0
Through Vol	87	130	0	0
RT Vol	0	133	0	121
Lane Flow Rate	222	286	46	132
Geometry Grp	2	2	7	7
Degree of Util (X)	0.296	0.345	0.078	0.181
Departure Headway (Hd)	4.81	4.347	6.169	4.958
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	745	826	579	719
Service Time	2.852	2.385	3.928	2.715
HCM Lane V/C Ratio	0.298	0.346	0.079	0.184
HCM Control Delay	9.9	9.7	9.5	8.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.2	1.5	0.3	0.7

**Intersection**

Intersection Delay, s/veh 19.1

Intersection LOS C













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	89	332	206	202	151	72
Future Vol, veh/h	89	332	206	202	151	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	361	224	220	164	78
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	19.6	22.9	11.3
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	50%	21%	0%	0%
Vol Thru, %	50%	0%	100%	0%
Vol Right, %	0%	79%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	408	421	151	72
LT Vol	206	89	0	0
Through Vol	202	0	151	0
RT Vol	0	332	0	72
Lane Flow Rate	443	458	164	78
Geometry Grp	5	2	7	7
Degree of Util (X)	0.724	0.687	0.3	0.127
Departure Headway (Hd)	5.881	5.401	6.57	5.855
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	612	664	543	608
Service Time	3.942	3.465	4.35	3.634
HCM Lane V/C Ratio	0.724	0.69	0.302	0.128
HCM Control Delay	22.9	19.6	12.2	9.5
HCM Lane LOS	C	C	B	A
HCM 95th-tile Q	6.1	5.4	1.3	0.4

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative AM Peak  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	195	593	148	296	231
Future Volume (veh/h)	59	195	593	148	296	231
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	64	212	645	161	322	251
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	242	550	729	618	376	1269
Arrive On Green	0.14	0.14	0.40	0.40	0.22	0.69
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	64	212	645	161	322	251
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	2.1	6.6	21.1	4.5	11.5	3.1
Cycle Q Clear(g_c), s	2.1	6.6	21.1	4.5	11.5	3.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	242	550	729	618	376	1269
V/C Ratio(X)	0.26	0.39	0.88	0.26	0.86	0.20
Avail Cap(c_a), veh/h	380	674	856	725	537	1394
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.8	15.5	18.0	13.0	24.3	3.5
Incr Delay (d2), s/veh	0.6	0.4	9.8	0.2	9.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.2	9.2	1.3	5.1	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.4	15.9	27.8	13.2	33.5	3.6
LnGrp LOS	C	B	C	B	C	A
Approach Vol, veh/h	276		806			573
Approach Delay, s/veh	18.1		24.9			20.4
Approach LOS	B		C			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	19.1	31.5			50.6	13.9
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	13.5	23.1			5.1	8.6
Green Ext Time (p_c), s	0.5	2.6			1.4	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			22.2			
HCM 6th LOS			C			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	10.1	33.2	7.2	17.2

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.1	1.2	0.0	0.5
Total Del/Veh (s)	6.0	9.4	17.3	10.8

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	1.9	0.9
Total Del/Veh (s)	17.1	9.4	13.5	13.6	11.9

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.4	2.7	0.8
Total Del/Veh (s)	11.1	12.4	14.9	35.4	18.5

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	7.0	7.3	25.9	12.7

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.3
Total Del/Veh (s)	11.7	20.3	17.6	5.2	13.5

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	2.2	1.2
Total Del/Veh (s)	14.5	18.1	11.8	13.7

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.5	0.0	0.2	0.5
Total Del/Veh (s)	12.2	6.9	11.4	9.3

---

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

---

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.2
Total Del/Veh (s)	9.6	10.4	1.1	7.2

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative AM Peak  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	30	3.0	0.273	8.7	LOS A	1.2	29.6	0.65	0.65	0.65	32.9
8	T1	63	3.0	0.273	8.7	LOS A	1.2	29.6	0.65	0.65	0.65	32.8
18	R2	90	3.0	0.273	8.7	LOS A	1.2	29.6	0.65	0.65	0.65	31.9
Approach		183	3.0	0.273	8.7	LOS A	1.2	29.6	0.65	0.65	0.65	32.4
East: Idaho Maryland Rd												
1	L2	241	3.0	0.258	6.5	LOS A	1.1	28.4	0.52	0.45	0.52	31.9
6	T1	158	3.0	0.452	9.2	LOS A	2.6	67.8	0.61	0.61	0.71	32.9
16	R2	264	3.0	0.452	9.2	LOS A	2.6	67.8	0.61	0.61	0.71	31.9
Approach		663	3.0	0.452	8.2	LOS A	2.6	67.8	0.58	0.55	0.64	32.1
North: Main St												
7	L2	143	3.0	0.359	7.7	LOS A	1.6	40.7	0.54	0.50	0.54	32.7
4	T1	197	3.0	0.359	7.7	LOS A	1.6	40.7	0.54	0.50	0.54	32.7
14	R2	209	3.0	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		549	3.0	0.359	4.8	LOS A	1.6	40.7	0.34	0.31	0.34	34.2
West: Main St												
5	L2	321	3.0	0.639	14.9	LOS B	5.8	147.7	0.76	0.97	1.37	29.3
2	T1	193	3.0	0.639	14.9	LOS B	5.8	147.7	0.76	0.97	1.37	29.3
12	R2	16	3.0	0.639	14.9	LOS B	5.8	147.7	0.76	0.97	1.37	28.6
Approach		530	3.0	0.639	14.9	LOS B	5.8	147.7	0.76	0.97	1.37	29.3
All Vehicles		1926	3.0	0.639	9.1	LOS A	5.8	147.7	0.56	0.61	0.75	31.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\26-30 Cum\5.1.3 Cum AM Peak Idaho Main.sip8

Intersection

Intersection Delay, s/veh20.7

Intersection LOS C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↑	
Traffic Vol, veh/h	79	324	3	0	0	0	0	129	168	177	387	0
Future Vol, veh/h	79	324	3	0	0	0	0	129	168	177	387	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	360	3	0	0	0	0	143	187	197	430	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach RightNB			EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	16.6	18.9	24.7
HCM LOS	C	C	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	33%	0%	100%	0%
Vol Thru, %	43%	67%	98%	0%	100%
Vol Right, %	57%	0%	2%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	297	241	165	177	387
LT Vol	0	79	0	177	0
Through Vol	129	162	162	0	387
RT Vol	168	0	3	0	0
Lane Flow Rate	330	268	183	197	430
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.597	0.541	0.361	0.387	0.785
Departure Headway (Hd)	6.515	7.275	7.095	7.083	6.573
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	551	493	506	505	546
Service Time	4.584	5.047	4.866	4.855	4.345
HCM Lane V/C Ratio	0.599	0.544	0.362	0.39	0.788
HCM Control Delay	18.9	18.4	13.9	14.3	29.4
HCM Lane LOS	C	C	B	B	D
HCM 95th-tile Q	3.9	3.2	1.6	1.8	7.3



HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative PM Peak  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	262	38	80	799	150	245
Future Volume (veh/h)	262	38	80	799	150	245
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	291	42	89	888	167	272
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	373	54	114	1192	282	821
Arrive On Green	0.23	0.23	0.36	0.36	0.16	0.16
Sat Flow, veh/h	1598	231	316	3409	1781	1585
Grp Volume(v), veh/h	0	333	522	455	167	272
Grp Sat Flow(s),veh/h/ln	0	1829	1855	1777	1781	1585
Q Serve(g_s), s	0.0	9.7	14.2	12.5	4.9	5.7
Cycle Q Clear(g_c), s	0.0	9.7	14.2	12.5	4.9	5.7
Prop In Lane		0.13	0.17		1.00	1.00
Lane Grp Cap(c), veh/h	0	427	667	639	282	821
V/C Ratio(X)	0.00	0.78	0.78	0.71	0.59	0.33
Avail Cap(c_a), veh/h	0	815	826	792	794	1276
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	20.4	16.2	15.7	22.2	8.0
Incr Delay (d2), s/veh	0.0	3.1	4.0	2.3	2.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		4.1	6.0	4.8	2.1	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	23.5	20.2	17.9	24.1	8.2
LnGrp LOS	A	C	C	B	C	A
Approach Vol, veh/h	333			977	439	
Approach Delay, s/veh	23.5			19.1	14.3	
Approach LOS	C			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		13.7		18.0		25.1
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		7.7		11.7		16.2
Green Ext Time (p_c), s		1.3		1.6		4.2

Intersection Summary

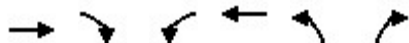
HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative PM Peak  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Volume (veh/h)	487	77	26	768	108	35
Future Volume (veh/h)	487	77	26	768	108	35
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	560	89	30	883	124	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	849	135	39	1214	168	54
Arrive On Green	0.28	0.28	0.34	0.34	0.13	0.13
Sat Flow, veh/h	3166	487	114	3621	1300	419
Grp Volume(v), veh/h	323	326	489	424	165	0
Grp Sat Flow(s),veh/h/ln1777	1783	1865	1777	1730	0	
Q Serve(g_s), s	9.0	9.1	13.0	11.5	5.1	0.0
Cycle Q Clear(g_c), s	9.0	9.1	13.0	11.5	5.1	0.0
Prop In Lane		0.27	0.06		0.75	0.24
Lane Grp Cap(c), veh/h	491	493	642	611	224	0
V/C Ratio(X)	0.66	0.66	0.76	0.69	0.74	0.00
Avail Cap(c_a), veh/h	1280	1285	843	804	291	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.9	17.9	16.3	15.8	23.4	0.0
Incr Delay (d2), s/veh	1.5	1.5	3.0	1.7	6.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln3.5	3.5	3.5	5.4	4.4	2.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.4	19.4	19.3	17.5	30.3	0.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	649			913	165	
Approach Delay, s/veh	19.4			18.5	30.3	
Approach LOS	B			B	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		11.8		20.2		23.9
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		9.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		7.1		11.1		15.0
Green Ext Time (p_c), s		0.1		4.4		4.2

Intersection Summary

HCM 6th Ctrl Delay	20.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative PM Peak  
 03/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗		↖ ↗	↖ ↗	
Traffic Volume (veh/h)	3	71	223	28	34	106	224	581	77	147	509	15
Future Volume (veh/h)	3	71	223	28	34	106	224	581	77	147	509	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	73	230	29	35	109	231	599	79	152	525	15
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	236	454	79	96	152	275	649	86	164	1194	34
Arrive On Green	0.13	0.13	0.13	0.10	0.10	0.10	0.15	0.40	0.40	0.09	0.34	0.34
Sat Flow, veh/h	74	1793	1585	829	1000	1585	1781	1618	213	1781	3528	101
Grp Volume(v), veh/h	76	0	230	64	0	109	231	0	678	152	264	276
Grp Sat Flow(s),veh/h/ln1867	0	1585	1829	0	1585	1781	0	1832	1781	1777	1852	
Q Serve(g_s), s	2.8	0.0	9.1	2.5	0.0	5.0	9.5	0.0	26.4	6.4	8.7	8.7
Cycle Q Clear(g_c), s	2.8	0.0	9.1	2.5	0.0	5.0	9.5	0.0	26.4	6.4	8.7	8.7
Prop In Lane	0.04		1.00	0.45		1.00	1.00		0.12	1.00		0.05
Lane Grp Cap(c), veh/h	246	0	454	175	0	152	275	0	734	164	601	627
V/C Ratio(X)	0.31	0.00	0.51	0.37	0.00	0.72	0.84	0.00	0.92	0.93	0.44	0.44
Avail Cap(c_a), veh/h	246	0	454	363	0	315	354	0	788	164	601	627
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	0.0	22.4	31.8	0.0	33.0	30.8	0.0	21.4	33.8	19.3	19.3
Incr Delay (d2), s/veh	0.7	0.0	0.9	1.3	0.0	6.3	13.3	0.0	15.8	49.7	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.3	0.0	0.0	3.3	1.1	0.0	2.1	4.9	0.0	13.6	4.9	3.5	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	0.0	23.3	33.1	0.0	39.2	44.1	0.0	37.2	83.5	19.8	19.8
LnGrp LOS	C	A	C	C	A	D	D	A	D	F	B	B
Approach Vol, veh/h		306			173			909			692	
Approach Delay, s/veh		25.0			36.9			39.0			33.8	
Approach LOS		C			D			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	2.0	35.8		15.0	16.7	31.1		12.3				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9.9	32.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+1/3), s	19.4	28.4		11.1	11.5	10.7		7.0				
Green Ext Time (p_c), s	0.0	1.7		0.0	0.2	2.7		0.4				

Intersection Summary

HCM 6th Ctrl Delay	35.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	4.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Vol, veh/h	193	91	29	687	666	87
Future Vol, veh/h	193	91	29	687	666	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	203	96	31	723	701	92

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1532	397	793	0	-	0
Stage 1	747	-	-	-	-	-
Stage 2	785	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 117	603	826	-	-	-
Stage 1	430	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 113	603	826	-	-	-
Mov Cap-2 Maneuver	308	-	-	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	448	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.8	0.4	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	826	-	308	603	-	-
HCM Lane V/C Ratio	0.037	-	0.66	0.159	-	-
HCM Control Delay (s)	9.5	-	36.7	12.1	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	4.4	0.6	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	29.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	23	24	19	23	40	79	10	333	34	151	517	77
Future Vol, veh/h	23	24	19	23	40	79	10	333	34	151	517	77
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	24	19	23	40	80	10	336	34	153	522	78
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11.1	11.9	18.8	39.8
HCM LOS	B	B	C	E

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	35%	16%	100%	0%
Vol Thru, %	0%	91%	36%	28%	0%	87%
Vol Right, %	0%	9%	29%	56%	0%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	10	367	66	142	151	594
LT Vol	10	0	23	23	151	0
Through Vol	0	333	24	40	0	517
RT Vol	0	34	19	79	0	77
Lane Flow Rate	10	371	67	143	153	600
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.019	0.633	0.129	0.259	0.266	0.946
Departure Headway (Hd)	6.725	6.151	6.975	6.507	6.273	5.675
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	530	586	510	549	572	636
Service Time	4.491	3.916	5.07	4.587	4.025	3.426
HCM Lane V/C Ratio	0.019	0.633	0.131	0.26	0.267	0.943
HCM Control Delay	9.6	19	11.1	11.9	11.3	47.1
HCM Lane LOS	A	C	B	B	B	E
HCM 95th-tile Q	0.1	4.4	0.4	1	1.1	13

Intersection						
Int Delay, s/veh	52					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	82	238	245	266	406	118
Future Vol, veh/h	82	238	245	266	406	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	259	266	289	441	128

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	266	0	-	0	703
Stage 1	-	-	-	-	266
Stage 2	-	-	-	-	437
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1298	-	-	0 ~ 404	773
Stage 1	-	-	-	0	779
Stage 2	-	-	-	0	651
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1298	-	-	- ~ 376	773
Mov Cap-2 Maneuver	-	-	-	- ~ 376	-
Stage 1	-	-	-	-	725
Stage 2	-	-	-	-	651

Approach	EB	WB	SB
HCM Control Delay, s	2	0	106.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1298	-	-	376	773
HCM Lane V/C Ratio	0.069	-	-	1.174	0.166
HCM Control Delay (s)	8	-	-	134.8	10.6
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	17.6	0.6

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative PM Peak  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	322	146	13	369	332	37
Future Volume (veh/h)	322	146	13	369	332	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	402	182	16	461	415	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	588	498	44	853	490	54
Arrive On Green	0.31	0.31	0.02	0.46	0.31	0.31
Sat Flow, veh/h	1870	1585	1781	1870	1581	175
Grp Volume(v), veh/h	402	182	16	461	462	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1760	0
Q Serve(g_s), s	7.5	3.6	0.4	7.1	9.9	0.0
Cycle Q Clear(g_c), s	7.5	3.6	0.4	7.1	9.9	0.0
Prop In Lane		1.00	1.00		0.90	0.10
Lane Grp Cap(c), veh/h	588	498	44	853	545	0
V/C Ratio(X)	0.68	0.37	0.37	0.54	0.85	0.00
Avail Cap(c_a), veh/h	1412	1197	324	1179	671	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.0	10.7	19.3	7.9	13.0	0.0
Incr Delay (d2), s/veh	1.4	0.4	5.1	0.5	8.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	1.0	0.2	2.1	4.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.4	11.1	24.4	8.4	21.3	0.0
LnGrp LOS	B	B	C	A	C	A
Approach Vol, veh/h	584			477	462	
Approach Delay, s/veh	12.7			9.0	21.3	
Approach LOS	B			A	C	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		17.1	5.7	17.3		23.0
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		11.9	2.4	9.5		9.1
Green Ext Time (p_c), s		0.6	0.0	3.1		2.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.1			
HCM 6th LOS			B			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	16
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	244	114	167	92	158	230
Future Vol, veh/h	244	114	167	92	158	230
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	287	134	196	108	186	271
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	20.4	13.9	13.4
HCM LOS	C	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	68%	0%	100%	0%
Vol Thru, %	32%	64%	0%	0%
Vol Right, %	0%	36%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	358	259	158	230
LT Vol	244	0	158	0
Through Vol	114	167	0	0
RT Vol	0	92	0	230
Lane Flow Rate	421	305	186	271
Geometry Grp	2	2	7	7
Degree of Util (X)	0.68	0.48	0.364	0.437
Departure Headway (Hd)	5.812	5.674	7.041	5.82
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	619	634	509	617
Service Time	3.863	3.732	4.797	3.575
HCM Lane V/C Ratio	0.68	0.481	0.365	0.439
HCM Control Delay	20.4	13.9	13.8	13.1
HCM Lane LOS	C	B	B	B
HCM 95th-tile Q	5.3	2.6	1.6	2.2



**Intersection**

Intersection Delay, s/veh 13.1  
Intersection LOS F













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	Y
Traffic Vol, veh/h	133	441	424	418	379	139
Future Vol, veh/h	133	441	424	418	379	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	479	461	454	412	151
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	108	390.9	40.4
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	50%	23%	0%	0%
Vol Thru, %	50%	0%	100%	0%
Vol Right, %	0%	77%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	842	574	379	139
LT Vol	424	133	0	0
Through Vol	418	0	379	0
RT Vol	0	441	0	139
Lane Flow Rate	915	624	412	151
Geometry Grp	5	2	7	7
Degree of Util (X)	1.809	1.127	0.872	0.29
Departure Headway (Hd)	7.586	7.705	9.231	8.498
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	485	474	395	426
Service Time	5.586	5.705	6.931	6.198
HCM Lane V/C Ratio	1.887	1.316	1.043	0.354
HCM Control Delay	390.9	108	49.9	14.6
HCM Lane LOS	F	F	E	B
HCM 95th-tile Q	54	18.2	8.6	1.2

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative PM Peak  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	157	363	387	48	132	570
Future Volume (veh/h)	157	363	387	48	132	570
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	171	395	421	52	143	620
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	461	578	547	463	189	938
Arrive On Green	0.26	0.26	0.30	0.30	0.11	0.51
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	171	395	421	52	143	620
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	3.9	10.4	10.1	1.2	3.9	12.1
Cycle Q Clear(g_c), s	3.9	10.4	10.1	1.2	3.9	12.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	461	578	547	463	189	938
V/C Ratio(X)	0.37	0.68	0.77	0.11	0.76	0.66
Avail Cap(c_a), veh/h	508	620	1142	968	717	1861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	12.7	15.4	12.3	20.9	8.7
Incr Delay (d2), s/veh	0.5	2.9	2.3	0.1	6.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.4	3.6	0.3	1.6	3.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.0	15.6	17.7	12.4	27.0	9.5
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	566		473			763
Approach Delay, s/veh	15.4		17.1			12.8
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.3	20.3			30.6	17.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	5.9	12.1			14.1	12.4
Green Ext Time (p_c), s	0.3	2.3			4.1	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.7			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.1	0.3	0.0	0.1
Total Del/Veh (s)	18.2	102.8	17.1	40.2

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.1	0.0	0.4
Total Del/Veh (s)	6.3	9.3	29.2	14.6

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.6	2.1	1.2
Total Del/Veh (s)	23.8	12.1	19.7	20.7	17.1

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.7	0.7
Total Del/Veh (s)	15.4	14.7	21.1	37.0	21.0

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.9	9.9	28.0	13.9

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.6	0.0	0.6
Total Del/Veh (s)	20.7	40.9	44.6	15.6	30.8

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.8	2.7	1.0
Total Del/Veh (s)	13.0	13.9	18.5	14.7

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	0.3	0.2	0.8
Total Del/Veh (s)	22.3	13.8	20.9	18.4

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.5	0.3
Total Del/Veh (s)	16.1	10.8	2.1	9.9

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative PM Peak  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	72	3.0	0.291	7.5	LOS A	1.3	34.3	0.59	0.55	0.59	33.1
8	T1	81	3.0	0.291	7.5	LOS A	1.3	34.3	0.59	0.55	0.59	33.0
18	R2	89	3.0	0.291	7.5	LOS A	1.3	34.3	0.59	0.55	0.59	32.1
Approach		242	3.0	0.291	7.5	LOS A	1.3	34.3	0.59	0.55	0.59	32.7
East: Idaho Maryland Rd												
1	L2	365	3.0	0.379	7.9	LOS A	1.8	46.8	0.56	0.49	0.56	31.2
6	T1	311	3.0	0.559	11.1	LOS B	4.7	121.3	0.66	0.73	0.95	32.1
16	R2	232	3.0	0.559	11.1	LOS B	4.7	121.3	0.66	0.73	0.95	31.2
Approach		907	3.0	0.559	9.8	LOS A	4.7	121.3	0.62	0.63	0.79	31.5
North: Main St												
7	L2	94	3.0	0.447	11.2	LOS B	2.4	60.3	0.68	0.77	0.96	31.5
4	T1	226	3.0	0.447	11.2	LOS B	2.4	60.3	0.68	0.77	0.96	31.4
14	R2	354	3.0	0.218	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		674	3.0	0.447	5.4	LOS A	2.4	60.3	0.32	0.37	0.45	34.2
West: Main St												
5	L2	229	3.0	0.519	12.4	LOS B	3.3	83.7	0.70	0.83	1.09	30.3
2	T1	131	3.0	0.519	12.4	LOS B	3.3	83.7	0.70	0.83	1.09	30.3
12	R2	33	3.0	0.519	12.4	LOS B	3.3	83.7	0.70	0.83	1.09	29.5
Approach		393	3.0	0.519	12.4	LOS B	3.3	83.7	0.70	0.83	1.09	30.2
All Vehicles		2216	3.0	0.559	8.7	LOS A	4.7	121.3	0.54	0.58	0.72	32.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	20	107	2	0	0	0	0	101	119	101	100	0
Future Vol, veh/h	20	107	2	0	0	0	0	101	119	101	100	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	116	2	0	0	0	0	110	129	110	109	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9.2	10.2	9.2
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	27%	0%	100%	0%
Vol Thru, %	46%	73%	96%	0%	100%
Vol Right, %	54%	0%	4%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	220	74	56	101	100
LT Vol	0	20	0	101	0
Through Vol	101	54	54	0	100
RT Vol	119	0	2	0	0
Lane Flow Rate	239	80	60	110	109
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.323	0.128	0.094	0.172	0.155
Departure Headway (Hd)	4.861	5.781	5.619	5.64	5.137
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	739	618	636	636	697
Service Time	2.898	3.532	3.37	3.381	2.877
HCM Lane V/C Ratio	0.323	0.129	0.094	0.173	0.156
HCM Control Delay	10.2	9.4	9	9.6	8.8
HCM Lane LOS	B	A	A	A	A
HCM 95th-tile Q	1.4	0.4	0.3	0.6	0.5

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative 0630 AM  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	207	15	44	171	119	391
Future Volume (veh/h)	207	15	44	171	119	391
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	225	16	48	186	129	425
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	325	23	128	528	510	742
Arrive On Green	0.19	0.19	0.18	0.18	0.29	0.29
Sat Flow, veh/h	1726	123	705	3001	1781	1585
Grp Volume(v), veh/h	0	241	125	109	129	425
Grp Sat Flow(s),veh/h/ln	0	1848	1835	1777	1781	1585
Q Serve(g_s), s	0.0	5.0	2.5	2.2	2.3	8.0
Cycle Q Clear(g_c), s	0.0	5.0	2.5	2.2	2.3	8.0
Prop In Lane		0.07	0.38		1.00	1.00
Lane Grp Cap(c), veh/h	0	348	333	323	510	742
V/C Ratio(X)	0.00	0.69	0.38	0.34	0.25	0.57
Avail Cap(c_a), veh/h	0	1141	1133	1097	1099	1266
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	15.5	14.7	14.6	11.3	7.9
Incr Delay (d2), s/veh	0.0	2.5	0.7	0.6	0.3	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr	0.0	2.0	0.9	0.8	0.8	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	18.0	15.4	15.2	11.5	8.6
LnGrp LOS	A	B	B	B	B	A
Approach Vol, veh/h	241			234	554	
Approach Delay, s/veh	18.0			15.3	9.3	
Approach LOS	B			B	A	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		16.4		12.4		12.1
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+I1), s		10.0		7.0		4.5
Green Ext Time (p_c), s		1.8		1.3		1.2

Intersection Summary

HCM 6th Ctrl Delay		12.7				
HCM 6th LOS			B			

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative 0630 AM  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Volume (veh/h)	536	77	24	180	45	7
Future Volume (veh/h)	536	77	24	180	45	7
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	583	84	26	196	49	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	1052	151	80	640	109	18
Arrive On Green	0.34	0.34	0.20	0.20	0.07	0.07
Sat Flow, veh/h	3212	448	405	3316	1481	242
Grp Volume(v), veh/h	332	335	119	103	58	0
Grp Sat Flow(s),veh/h/ln1777	1790	1850	1777	1753	0	
Q Serve(g_s), s	5.5	5.5	2.0	1.8	1.1	0.0
Cycle Q Clear(g_c), s	5.5	5.5	2.0	1.8	1.1	0.0
Prop In Lane		0.25	0.22		0.84	0.14
Lane Grp Cap(c), veh/h	600	604	368	353	129	0
V/C Ratio(X)	0.55	0.56	0.32	0.29	0.45	0.00
Avail Cap(c_a), veh/h	1997	2012	1306	1254	508	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.7	9.7	12.3	12.2	15.9	0.0
Incr Delay (d2), s/veh	0.8	0.8	0.5	0.5	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.6		1.7	0.7	0.6	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.5	10.5	12.8	12.7	18.4	0.0
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	667			222	58	
Approach Delay, s/veh	10.5			12.7	18.4	
Approach LOS	B			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		7.2		16.8		11.8
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		10.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		3.1		7.5		4.0
Green Ext Time (p_c), s		0.1		4.6		1.2

Intersection Summary

HCM 6th Ctrl Delay	11.5
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative 0630 AM  
 03/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↗		↖	↗	↖	↔		↖	↗	
Traffic Volume (veh/h)	0	5	98	74	50	89	106	224	11	13	270	5
Future Volume (veh/h)	0	5	98	74	50	89	106	224	11	13	270	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	110	80	54	97	115	243	12	14	293	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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	190	649	140	95	205	184	476	23	32	656	11
Arrive On Green	0.00	0.00	0.10	0.13	0.13	0.13	0.10	0.27	0.27	0.02	0.18	0.18
Sat Flow, veh/h	0	1870	3170	1084	732	1585	1781	1767	87	1781	3575	61
Grp Volume(v), veh/h	0	0	110	134	0	97	115	0	255	14	145	153
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1816	0	1585	1781	0	1855	1781	1777	1859
Q Serve(g_s), s	0.0	0.0	1.2	3.0	0.0	2.5	2.7	0.0	5.1	0.3	3.2	3.2
Cycle Q Clear(g_c), s	0.0	0.0	1.2	3.0	0.0	2.5	2.7	0.0	5.1	0.3	3.2	3.2
Prop In Lane	0.00		1.00	0.60		1.00	1.00		0.05	1.00		0.03
Lane Grp Cap(c), veh/h	0	190	649	235	0	205	184	0	499	32	326	341
V/C Ratio(X)	0.00	0.00	0.17	0.57	0.00	0.47	0.62	0.00	0.51	0.44	0.45	0.45
Avail Cap(c_a), veh/h	0	425	1049	621	0	542	610	0	1248	282	992	1038
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	14.3	17.8	0.0	17.6	18.7	0.0	13.5	21.2	15.8	15.8
Incr Delay (d2), s/veh	0.0	0.0	0.1	2.2	0.0	1.7	3.4	0.0	0.8	9.2	1.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr	0.0	0.0	0.4	1.2	0.0	0.9	1.1	0.0	1.7	0.2	1.1	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	14.4	20.0	0.0	19.3	22.1	0.0	14.3	30.4	16.8	16.7
LnGrp LOS	A	A	B	B	A	B	C	A	B	C	B	B
Approach Vol, veh/h		110			231			370			312	
Approach Delay, s/veh		14.4			19.7			16.7			17.4	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	17.4		9.5	9.6	13.7		10.7				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9	29.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+I), s	12.3	7.1		3.2	4.7	5.2		5.0				
Green Ext Time (p_c), s	0.0	1.3		0.2	0.2	1.4		0.7				

Intersection Summary

HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↑	↑↑	
Traffic Vol, veh/h	20	30	56	321	313	98
Future Vol, veh/h	20	30	56	321	313	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	33	61	349	340	107

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	865	224	447	0	-	0
Stage 1	394	-	-	-	-	-
Stage 2	471	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	308	780	1111	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	627	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	291	780	1111	-	-	-
Mov Cap-2 Maneuver	485	-	-	-	-	-
Stage 1	615	-	-	-	-	-
Stage 2	627	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1111	-	485	780	-	-
HCM Lane V/C Ratio	0.055	-	0.045	0.042	-	-
HCM Control Delay (s)	8.4	-	12.8	9.8	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	0.1	-	-

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	17	10	9	28	25	80	15	314	6	25	103	12
Future Vol, veh/h	17	10	9	28	25	80	15	314	6	25	103	12
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	11	10	30	27	87	16	341	7	27	112	13
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	8.8	9.3	12.7	9.1
HCM LOS	A	A	B	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	21%	100%	0%
Vol Thru, %	0%	98%	28%	19%	0%	90%
Vol Right, %	0%	2%	25%	60%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	15	320	36	133	25	115
LT Vol	15	0	17	28	25	0
Through Vol	0	314	10	25	0	103
RT Vol	0	6	9	80	0	12
Lane Flow Rate	16	348	39	145	27	125
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.026	0.496	0.058	0.199	0.044	0.183
Departure Headway (Hd)	5.646	5.13	5.375	4.95	5.85	5.272
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	631	699	661	721	608	676
Service Time	3.405	2.888	3.455	3.01	3.62	3.041
HCM Lane V/C Ratio	0.025	0.498	0.059	0.201	0.044	0.185
HCM Control Delay	8.6	12.9	8.8	9.3	8.9	9.2
HCM Lane LOS	A	B	A	A	A	A
HCM 95th-tile Q	0.1	2.8	0.2	0.7	0.1	0.7

Intersection						
Int Delay, s/veh	6.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	116	49	133	242	118	44
Future Vol, veh/h	116	49	133	242	118	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	126	53	145	263	128	48

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	145	0	-	0	450 145
Stage 1	-	-	-	-	145 -
Stage 2	-	-	-	-	305 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1437	-	-	0	567 902
Stage 1	-	-	-	0	882 -
Stage 2	-	-	-	0	748 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1437	-	-	-	517 902
Mov Cap-2 Maneuver	-	-	-	-	517 -
Stage 1	-	-	-	-	804 -
Stage 2	-	-	-	-	748 -

Approach	EB	WB	SB
HCM Control Delay, s	5.4	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1437	-	-	517	902
HCM Lane V/C Ratio	0.088	-	-	0.248	0.053
HCM Control Delay (s)	7.7	-	-	14.2	9.2
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	1	0.2

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative 0630 AM  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	135	251	7	123	41	5
Future Volume (veh/h)	135	251	7	123	41	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	147	273	8	134	45	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	609	516	23	1001	112	12
Arrive On Green	0.33	0.33	0.01	0.54	0.07	0.07
Sat Flow, veh/h	1870	1585	1781	1870	1554	173
Grp Volume(v), veh/h	147	273	8	134	51	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1762	0
Q Serve(g_s), s	1.4	3.4	0.1	0.9	0.7	0.0
Cycle Q Clear(g_c), s	1.4	3.4	0.1	0.9	0.7	0.0
Prop In Lane		1.00	1.00		0.88	0.10
Lane Grp Cap(c), veh/h	609	516	23	1001	127	0
V/C Ratio(X)	0.24	0.53	0.35	0.13	0.40	0.00
Avail Cap(c_a), veh/h	2368	2007	543	1977	1126	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.9	6.6	11.7	2.8	10.6	0.0
Incr Delay (d2), s/veh	0.2	0.8	8.6	0.1	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.7	0.1	0.0	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.1	7.4	20.3	2.8	12.7	0.0
LnGrp LOS	A	A	C	A	B	A
Approach Vol, veh/h	420			142	51	
Approach Delay, s/veh	7.0			3.8	12.7	
Approach LOS	A			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		6.4	5.0	12.5		17.5
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		2.7	2.1	5.4		2.9
Green Ext Time (p_c), s		0.1	0.0	1.8		0.7
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			6.7			
HCM 6th LOS			A			
<b>Notes</b>						
User approved pedestrian interval to be less than phase max green.						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	50	72	80	63	24	54
Future Vol, veh/h	50	72	80	63	24	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	78	87	68	26	59
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.2	7.9	7.8
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	41%	0%	100%	0%
Vol Thru, %	59%	56%	0%	0%
Vol Right, %	0%	44%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	122	143	24	54
LT Vol	50	0	24	0
Through Vol	72	80	0	0
RT Vol	0	63	0	54
Lane Flow Rate	133	155	26	59
Geometry Grp	2	2	7	7
Degree of Util (X)	0.162	0.173	0.041	0.073
Departure Headway (Hd)	4.385	4.017	5.66	4.454
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	824	895	635	806
Service Time	2.385	2.028	3.375	2.169
HCM Lane V/C Ratio	0.161	0.173	0.041	0.073
HCM Control Delay	8.2	7.9	8.6	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.6	0.1	0.2

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	167	116	82	73	43
Future Vol, veh/h	28	167	116	82	73	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	182	126	89	79	47
Number of Lanes	1	0	0	1	1	1













Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.7	9.7	8.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	59%	14%	0%	0%
Vol Thru, %	41%	0%	100%	0%
Vol Right, %	0%	86%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	198	195	73	43
LT Vol	116	28	0	0
Through Vol	82	0	73	0
RT Vol	0	167	0	43
Lane Flow Rate	215	212	79	47
Geometry Grp	5	2	7	7
Degree of Util (X)	0.285	0.251	0.115	0.058
Departure Headway (Hd)	4.77	4.261	5.198	4.493
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	753	844	689	795
Service Time	2.806	2.287	2.938	2.232
HCM Lane V/C Ratio	0.286	0.251	0.115	0.059
HCM Control Delay	9.7	8.7	8.6	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.2	1	0.4	0.2



HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative 0630 AM  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	79	283	127	209	112
Future Volume (veh/h)	30	79	283	127	209	112
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	33	86	308	138	227	122
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	172	423	486	411	303	1075
Arrive On Green	0.10	0.10	0.27	0.27	0.17	0.59
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	33	86	308	138	227	122
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.6	1.5	5.1	2.5	4.2	1.0
Cycle Q Clear(g_c), s	0.6	1.5	5.1	2.5	4.2	1.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	172	423	486	411	303	1075
V/C Ratio(X)	0.19	0.20	0.63	0.34	0.75	0.11
Avail Cap(c_a), veh/h	715	906	1609	1363	1010	2621
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	9.6	11.1	10.1	13.4	3.1
Incr Delay (d2), s/veh	0.5	0.2	1.4	0.5	3.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	1.5	0.6	1.4	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.7	9.8	12.5	10.6	17.2	3.1
LnGrp LOS	B	A	B	B	B	A
Approach Vol, veh/h	119		446			349
Approach Delay, s/veh	11.2		11.9			12.3
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.1	14.9			26.0	8.3
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.2	7.1			3.0	3.5
Green Ext Time (p_c), s	0.5	2.0			0.6	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.9			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	3.5	14.2	4.2	6.7

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.1	0.0	0.3
Total Del/Veh (s)	3.8	6.1	12.9	7.2

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.4	2.1	1.0
Total Del/Veh (s)	14.2	4.3	7.5	7.1	6.1

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.9	2.9	0.9
Total Del/Veh (s)	4.5	9.1	20.6	38.5	17.1

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.3	3.7	19.7	8.3

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	1.5	0.0	0.2
Total Del/Veh (s)	5.9	8.9	10.4	1.0	5.3

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.4	2.1	1.3
Total Del/Veh (s)	12.7	14.0	5.8	8.9

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.9	0.0	0.1	0.3
Total Del/Veh (s)	6.7	4.8	6.6	5.6

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	5.7	7.9	0.5	4.1

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative 0630-0730 AM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	13	3.0	0.092	4.9	LOS A	0.4	9.6	0.48	0.38	0.48	34.8
8	T1	21	3.0	0.092	4.9	LOS A	0.4	9.6	0.48	0.38	0.48	34.7
18	R2	48	3.0	0.092	4.9	LOS A	0.4	9.6	0.48	0.38	0.48	33.7
Approach		82	3.0	0.092	4.9	LOS A	0.4	9.6	0.48	0.38	0.48	34.1
East: Idaho Maryland Rd												
1	L2	122	3.0	0.107	4.1	LOS A	0.4	11.0	0.33	0.21	0.33	32.9
6	T1	65	3.0	0.159	4.6	LOS A	0.7	17.0	0.35	0.23	0.35	35.4
16	R2	116	3.0	0.159	4.6	LOS A	0.7	17.0	0.35	0.23	0.35	34.2
Approach		303	3.0	0.159	4.4	LOS A	0.7	17.0	0.34	0.22	0.34	33.9
North: Main St												
7	L2	77	3.0	0.208	5.0	LOS A	0.9	22.1	0.34	0.22	0.34	34.4
4	T1	165	3.0	0.208	5.0	LOS A	0.9	22.1	0.34	0.22	0.34	34.3
14	R2	78	3.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		319	3.0	0.208	3.8	LOS A	0.9	22.1	0.25	0.17	0.25	35.0
West: Main St												
5	L2	173	3.0	0.338	7.1	LOS A	1.5	38.5	0.50	0.43	0.50	32.8
2	T1	142	3.0	0.338	7.1	LOS A	1.5	38.5	0.50	0.43	0.50	32.7
12	R2	25	3.0	0.338	7.1	LOS A	1.5	38.5	0.50	0.43	0.50	31.8
Approach		339	3.0	0.338	7.1	LOS A	1.5	38.5	0.50	0.43	0.50	32.7
All Vehicles		1043	3.0	0.338	5.1	LOS A	1.5	38.5	0.38	0.28	0.38	33.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	62	378	5	0	0	0	0	103	170	168	360	0
Future Vol, veh/h	62	378	5	0	0	0	0	103	170	168	360	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	411	5	0	0	0	0	112	185	183	391	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	16.2	16.7	20.9
HCM LOS	C	C	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	25%	0%	100%	0%
Vol Thru, %	38%	75%	97%	0%	100%
Vol Right, %	62%	0%	3%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	273	251	194	168	360
LT Vol	0	62	0	168	0
Through Vol	103	189	189	0	360
RT Vol	170	0	5	0	0
Lane Flow Rate	297	273	211	183	391
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.533	0.535	0.405	0.359	0.714
Departure Headway (Hd)	6.462	7.056	6.912	7.074	6.565
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	555	510	519	508	548
Service Time	4.528	4.822	4.678	4.842	4.333
HCM Lane V/C Ratio	0.535	0.535	0.407	0.36	0.714
HCM Control Delay	16.7	17.7	14.3	13.8	24.2
HCM Lane LOS	C	C	B	B	C
HCM 95th-tile Q	3.1	3.1	1.9	1.6	5.8

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative 1530 PM  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	342	50	70	666	180	259
Future Volume (veh/h)	342	50	70	666	180	259
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	364	53	74	709	191	276
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	448	65	100	1004	303	752
Arrive On Green	0.28	0.28	0.30	0.30	0.17	0.17
Sat Flow, veh/h	1596	232	328	3396	1781	1585
Grp Volume(v), veh/h	0	417	418	365	191	276
Grp Sat Flow(s),veh/h/ln	0	1829	1854	1777	1781	1585
Q Serve(g_s), s	0.0	12.2	11.7	10.3	5.7	6.4
Cycle Q Clear(g_c), s	0.0	12.2	11.7	10.3	5.7	6.4
Prop In Lane		0.13	0.18		1.00	1.00
Lane Grp Cap(c), veh/h	0	513	564	540	303	752
V/C Ratio(X)	0.00	0.81	0.74	0.67	0.63	0.37
Avail Cap(c_a), veh/h	0	804	815	781	783	1179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	19.3	18.0	17.5	22.2	9.6
Incr Delay (d2), s/veh	0.0	3.6	2.1	1.5	2.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		5.2	4.8	4.0	2.4	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	22.9	20.1	19.0	24.4	9.9
LnGrp LOS	A	C	C	B	C	A
Approach Vol, veh/h	417			783	467	
Approach Delay, s/veh	22.9			19.6	15.8	
Approach LOS	C			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		14.5		20.9		22.2
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+I1), s		8.4		14.2		13.7
Green Ext Time (p_c), s		1.4		2.0		3.8

Intersection Summary

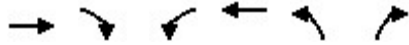
HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 7: Railroad Ave & Idaho Maryland Rd

Cumulative 1530 PM  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	500	94	35	634	124	57
Future Volume (veh/h)	500	94	35	634	124	57
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	543	102	38	689	135	62
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	845	158	54	1028	177	81
Arrive On Green	0.28	0.28	0.30	0.30	0.15	0.15
Sat Flow, veh/h	3081	559	182	3550	1169	537
Grp Volume(v), veh/h	322	323	389	338	198	0
Grp Sat Flow(s),veh/h/ln	1777	1770	1861	1777	1715	0
Q Serve(g_s), s	8.3	8.3	9.7	8.6	5.8	0.0
Cycle Q Clear(g_c), s	8.3	8.3	9.7	8.6	5.8	0.0
Prop In Lane		0.32	0.10		0.68	0.31
Lane Grp Cap(c), veh/h	503	501	554	529	259	0
V/C Ratio(X)	0.64	0.64	0.70	0.64	0.76	0.00
Avail Cap(c_a), veh/h	1374	1368	904	863	309	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.4	16.4	16.3	15.9	21.2	0.0
Incr Delay (d2), s/veh	1.4	1.4	1.6	1.3	9.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	3.2	3.8	3.2	2.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.7	17.8	17.9	17.2	30.3	0.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	645			727	198	
Approach Delay, s/veh	17.8			17.6	30.3	
Approach LOS	B			B	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		12.5		19.4		20.2
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		9.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		7.8		10.3		11.7
Green Ext Time (p_c), s		0.1		4.4		3.8

Intersection Summary

HCM 6th Ctrl Delay	19.3
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative 1530 PM  
 03/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↗		↖	↗	
Traffic Volume (veh/h)	3	65	217	32	31	69	173	571	70	137	477	14
Future Volume (veh/h)	3	65	217	32	31	69	173	571	70	137	477	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	69	231	34	33	73	184	607	74	146	507	15
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	11	242	417	72	69	123	228	662	81	168	1310	39
Arrive On Green	0.14	0.14	0.14	0.08	0.08	0.08	0.13	0.41	0.41	0.09	0.37	0.37
Sat Flow, veh/h	78	1789	1585	926	898	1585	1781	1635	199	1781	3524	104
Grp Volume(v), veh/h	72	0	231	67	0	73	184	0	681	146	255	267
Grp Sat Flow(s),veh/h/ln	1866	0	1585	1824	0	1585	1781	0	1834	1781	1777	1852
Q Serve(g_s), s	2.5	0.0	9.2	2.6	0.0	3.3	7.3	0.0	25.7	5.9	7.7	7.7
Cycle Q Clear(g_c), s	2.5	0.0	9.2	2.6	0.0	3.3	7.3	0.0	25.7	5.9	7.7	7.7
Prop In Lane	0.04		1.00	0.51		1.00	1.00		0.11	1.00		0.06
Lane Grp Cap(c), veh/h	253	0	417	141	0	123	228	0	743	168	660	688
V/C Ratio(X)	0.28	0.00	0.55	0.47	0.00	0.60	0.81	0.00	0.92	0.87	0.39	0.39
Avail Cap(c_a), veh/h	253	0	417	372	0	323	363	0	811	168	660	688
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	23.2	32.3	0.0	32.6	31.0	0.0	20.6	32.6	16.8	16.8
Incr Delay (d2), s/veh	0.6	0.0	1.6	2.5	0.0	4.6	7.0	0.0	14.4	35.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	3.4	1.2	0.0	1.4	3.5	0.0	12.9	4.1	3.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	24.8	34.7	0.0	37.1	37.9	0.0	34.9	67.6	17.2	17.2
LnGrp LOS	C	A	C	C	A	D	D	A	C	E	B	B
Approach Vol, veh/h		303			140			865			668	
Approach Delay, s/veh		25.8			36.0			35.6			28.2	
Approach LOS		C			D			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	2.0	35.3		15.0	14.4	32.8		10.7				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9.9	32.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+1), s	9.9	27.7		11.2	9.3	9.7		5.3				
Green Ext Time (p_c), s	0.0	1.9		0.0	0.2	2.7		0.3				

Intersection Summary

HCM 6th Ctrl Delay	31.6
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Vol, veh/h	141	118	49	648	638	70
Future Vol, veh/h	141	118	49	648	638	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	122	51	668	658	72

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1464	365	730	0	-	0
Stage 1	694	-	-	-	-	-
Stage 2	770	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 130	633	872	-	-	-
Stage 1	458	-	-	-	-	-
Stage 2	456	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 122	633	872	-	-	-
Mov Cap-2 Maneuver	319	-	-	-	-	-
Stage 1	431	-	-	-	-	-
Stage 2	456	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.3	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	872	-	319	633	-	-
HCM Lane V/C Ratio	0.058	-	0.456	0.192	-	-
HCM Control Delay (s)	9.4	-	25.4	12	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.3	0.7	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	23.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	28	33	10	16	25	77	8	349	23	129	455	62
Future Vol, veh/h	28	33	10	16	25	77	8	349	23	129	455	62
Peak Hour Factor	0.94	0.90	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	37	11	17	27	82	9	371	24	137	484	66
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11.3	11.4	19.9	29.6
HCM LOS	B	B	C	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	39%	14%	100%	0%
Vol Thru, %	0%	94%	46%	21%	0%	88%
Vol Right, %	0%	6%	14%	65%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	372	71	118	129	517
LT Vol	8	0	28	16	129	0
Through Vol	0	349	33	25	0	455
RT Vol	0	23	10	77	0	62
Lane Flow Rate	9	396	77	126	137	550
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.016	0.665	0.149	0.224	0.239	0.866
Departure Headway (Hd)	6.603	6.051	6.946	6.427	6.26	5.668
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	540	594	513	555	572	638
Service Time	4.365	3.813	5.035	4.508	4.011	3.419
HCM Lane V/C Ratio	0.017	0.667	0.15	0.227	0.24	0.862
HCM Control Delay	9.5	20.1	11.3	11.4	11	34.3
HCM Lane LOS	A	C	B	B	B	D
HCM 95th-tile Q	0	5	0.5	0.9	0.9	10

Intersection						
Int Delay, s/veh	22.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	90	216	191	285	344	114
Future Vol, veh/h	90	216	191	285	344	114
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	235	208	310	374	124

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	208	0	-	0	639 208
Stage 1	-	-	-	-	208 -
Stage 2	-	-	-	-	431 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1363	-	-	0	440 832
Stage 1	-	-	-	0	827 -
Stage 2	-	-	-	0	655 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1363	-	-	-	408 832
Mov Cap-2 Maneuver	-	-	-	-	408 -
Stage 1	-	-	-	-	767 -
Stage 2	-	-	-	-	655 -

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	46.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1363	-	-	408	832
HCM Lane V/C Ratio	0.072	-	-	0.916	0.149
HCM Control Delay (s)	7.8	-	-	58.2	10.1
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	9.9	0.5

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	380	482	0
Future Vol, veh/h	0	0	0	380	482	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	413	524	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	937	524	524	0	-	0
Stage 1	524	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	294	553	1043	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	294	553	1043	-	-	-
Mov Cap-2 Maneuver	489	-	-	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	668	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1043	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	70	0	0	90	0	0
Future Vol, veh/h	70	0	0	90	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	0	0	98	0	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	76	0	174
Stage 1	-	-	-	-	76
Stage 2	-	-	-	-	98
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1523	-	816
Stage 1	-	-	-	-	947
Stage 2	-	-	-	-	926
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1523	-	816
Mov Cap-2 Maneuver	-	-	-	-	816
Stage 1	-	-	-	-	947
Stage 2	-	-	-	-	926

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1523	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	140	0	0	238	0	0	0	0	1	0	0
Future Vol, veh/h	5	140	0	0	238	0	0	0	0	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	152	0	0	259	0	0	0	0	1	0	0

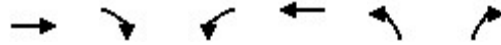
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	152	0	0	443	443	152	443	443	259
Stage 1	-	-	-	-	-	-	184	184	-	259	259	-
Stage 2	-	-	-	-	-	-	259	259	-	184	184	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1306	-	-	1429	-	-	525	509	894	525	509	780
Stage 1	-	-	-	-	-	-	818	747	-	746	694	-
Stage 2	-	-	-	-	-	-	746	694	-	818	747	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1306	-	-	1429	-	-	520	502	894	520	502	780
Mov Cap-2 Maneuver	-	-	-	-	-	-	520	502	-	520	502	-
Stage 1	-	-	-	-	-	-	807	737	-	736	694	-
Stage 2	-	-	-	-	-	-	746	694	-	807	737	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0	0	11.9
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1306	-	-	1429	-	-	520
HCM Lane V/C Ratio	-	0.012	-	-	-	-	-	0.002
HCM Control Delay (s)	0	7.8	0	-	0	-	-	11.9
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative 1530 PM  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	322	146	13	369	332	37
Future Volume (veh/h)	322	146	13	369	332	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	350	159	14	401	361	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	550	466	39	838	454	50
Arrive On Green	0.29	0.29	0.02	0.45	0.29	0.29
Sat Flow, veh/h	1870	1585	1781	1870	1580	175
Grp Volume(v), veh/h	350	159	14	401	402	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1760	0
Q Serve(g_s), s	5.8	2.8	0.3	5.3	7.5	0.0
Cycle Q Clear(g_c), s	5.8	2.8	0.3	5.3	7.5	0.0
Prop In Lane		1.00	1.00		0.90	0.10
Lane Grp Cap(c), veh/h	550	466	39	838	505	0
V/C Ratio(X)	0.64	0.34	0.36	0.48	0.80	0.00
Avail Cap(c_a), veh/h	1596	1353	366	1333	758	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.9	9.8	17.1	6.9	11.7	0.0
Incr Delay (d2), s/veh	1.2	0.4	5.5	0.4	3.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.8	0.2	1.4	2.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.1	10.3	22.7	7.3	15.2	0.0
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h				415	402	
Approach Delay, s/veh				11.5	15.2	
Approach LOS				B	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		14.9	5.5	15.1		20.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		9.5	2.3	7.8		7.3
Green Ext Time (p_c), s		0.7	0.0	2.7		2.3
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.5			
HCM 6th LOS			B			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	244	114	167	92	158	230
Future Vol, veh/h	244	114	167	92	158	230
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	265	124	182	100	172	250
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	17.2	12.7	12.4
HCM LOS	C	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	68%	0%	100%	0%
Vol Thru, %	32%	64%	0%	0%
Vol Right, %	0%	36%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	358	259	158	230
LT Vol	244	0	158	0
Through Vol	114	167	0	0
RT Vol	0	92	0	230
Lane Flow Rate	389	282	172	250
Geometry Grp	2	2	7	7
Degree of Util (X)	0.611	0.43	0.327	0.392
Departure Headway (Hd)	5.656	5.496	6.862	5.643
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	638	653	524	638
Service Time	3.697	3.541	4.606	3.386
HCM Lane V/C Ratio	0.61	0.432	0.328	0.392
HCM Control Delay	17.2	12.7	12.9	12
HCM Lane LOS	C	B	B	B
HCM 95th-tile Q	4.2	2.2	1.4	1.9

**Intersection**

Intersection Delay, s/veh 13.1  
Intersection LOS F













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	Y
Traffic Vol, veh/h	133	441	424	418	379	139
Future Vol, veh/h	133	441	424	418	379	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	479	461	454	412	151
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	108	390.9	40.4
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	50%	23%	0%	0%
Vol Thru, %	50%	0%	100%	0%
Vol Right, %	0%	77%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	842	574	379	139
LT Vol	424	133	0	0
Through Vol	418	0	379	0
RT Vol	0	441	0	139
Lane Flow Rate	915	624	412	151
Geometry Grp	5	2	7	7
Degree of Util (X)	1.809	1.127	0.872	0.29
Departure Headway (Hd)	7.586	7.705	9.231	8.498
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	485	474	395	426
Service Time	5.586	5.705	6.931	6.198
HCM Lane V/C Ratio	1.887	1.316	1.043	0.354
HCM Control Delay	390.9	108	49.9	14.6
HCM Lane LOS	F	F	E	B
HCM 95th-tile Q	54	18.2	8.6	1.2

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative 1530 PM  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	183	349	375	78	182	450
Future Volume (veh/h)	183	349	375	78	182	450
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	199	379	408	85	198	489
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	429	610	531	450	256	986
Arrive On Green	0.25	0.25	0.29	0.29	0.15	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	199	379	408	85	198	489
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	4.9	9.9	10.2	2.1	5.5	8.4
Cycle Q Clear(g_c), s	4.9	9.9	10.2	2.1	5.5	8.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	429	610	531	450	256	986
V/C Ratio(X)	0.46	0.62	0.77	0.19	0.77	0.50
Avail Cap(c_a), veh/h	489	663	1099	931	690	1790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.1	12.2	16.3	13.4	20.6	7.3
Incr Delay (d2), s/veh	0.8	1.6	2.4	0.2	4.9	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	3.0	3.7	0.6	2.2	2.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.8	13.8	18.6	13.6	25.5	7.6
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	578		493			687
Approach Delay, s/veh	14.8		17.8			12.8
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.5	20.4			32.9	17.3
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	7.5	12.2			10.4	11.9
Green Ext Time (p_c), s	0.4	2.3			3.0	0.5
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.8			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	11.3	14.8	5.8	9.0

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.0	0.9	0.6
Total Del/Veh (s)	5.3	8.6	16.5	9.9

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.7	2.1	1.2
Total Del/Veh (s)	20.6	9.9	16.6	16.7	14.0

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.6
Total Del/Veh (s)	12.6	13.2	17.1	33.1	16.9

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	10.6	9.8	29.4	14.9

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.6	0.0	0.6
Total Del/Veh (s)	20.2	38.5	38.9	13.9	28.2

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.8	2.7	1.0
Total Del/Veh (s)	13.3	14.1	18.2	14.8

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	0.0	0.2	0.7
Total Del/Veh (s)	21.1	13.4	20.5	17.6

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.4	0.3
Total Del/Veh (s)	12.4	10.0	1.9	8.0

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative 1530-1630 PM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	57	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	33.3
8	T1	63	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	33.2
18	R2	106	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	32.3
Approach		226	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	32.8
East: Idaho Maryland Rd												
1	L2	367	3.0	0.364	7.4	LOS A	1.8	45.2	0.52	0.44	0.52	31.4
6	T1	261	3.0	0.461	8.9	LOS A	2.6	65.6	0.57	0.50	0.59	33.2
16	R2	206	3.0	0.461	8.9	LOS A	2.6	65.6	0.57	0.50	0.59	32.2
Approach		834	3.0	0.461	8.2	LOS A	2.6	65.6	0.55	0.48	0.56	32.1
North: Main St												
7	L2	115	3.0	0.475	11.4	LOS B	2.7	69.8	0.68	0.78	0.99	31.4
4	T1	245	3.0	0.475	11.4	LOS B	2.7	69.8	0.68	0.78	0.99	31.3
14	R2	333	3.0	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		693	3.0	0.475	5.9	LOS A	2.7	69.8	0.35	0.41	0.51	33.8
West: Main St												
5	L2	215	3.0	0.532	13.1	LOS B	3.4	86.2	0.72	0.86	1.14	30.1
2	T1	135	3.0	0.532	13.1	LOS B	3.4	86.2	0.72	0.86	1.14	30.1
12	R2	39	3.0	0.532	13.1	LOS B	3.4	86.2	0.72	0.86	1.14	29.3
Approach		389	3.0	0.532	13.1	LOS B	3.4	86.2	0.72	0.86	1.14	30.0
All Vehicles		2142	3.0	0.532	8.3	LOS A	3.4	86.2	0.52	0.53	0.65	32.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	37	208	4	0	0	0	0	65	66	118	235	0
Future Vol, veh/h	37	208	4	0	0	0	0	65	66	118	235	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	226	4	0	0	0	0	71	72	128	255	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

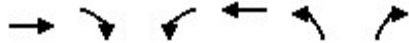
Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.5	10	11.2
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	26%	0%	100%	0%
Vol Thru, %	50%	74%	96%	0%	100%
Vol Right, %	50%	0%	4%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	131	141	108	118	235
LT Vol	0	37	0	118	0
Through Vol	65	104	104	0	235
RT Vol	66	0	4	0	0
Lane Flow Rate	142	153	117	128	255
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.215	0.254	0.19	0.212	0.386
Departure Headway (Hd)	5.441	5.977	5.819	5.948	5.444
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	654	596	612	599	656
Service Time	3.529	3.766	3.608	3.725	3.221
HCM Lane V/C Ratio	0.217	0.257	0.191	0.214	0.389
HCM Control Delay	10	10.8	10	10.3	11.6
HCM Lane LOS	A	B	A	B	B
HCM 95th-tile Q	0.8	1	0.7	0.8	1.8



HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative 1830 PM  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	130	28	23	284	73	107
Future Volume (veh/h)	130	28	23	284	73	107
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	141	30	25	309	79	116
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	277	59	57	740	345	655
Arrive On Green	0.18	0.18	0.22	0.22	0.19	0.19
Sat Flow, veh/h	1495	318	260	3468	1781	1585
Grp Volume(v), veh/h	0	171	179	155	79	116
Grp Sat Flow(s),veh/h/ln	0	1813	1857	1777	1781	1585
Q Serve(g_s), s	0.0	3.0	2.9	2.6	1.3	1.6
Cycle Q Clear(g_c), s	0.0	3.0	2.9	2.6	1.3	1.6
Prop In Lane		0.18	0.14		1.00	1.00
Lane Grp Cap(c), veh/h	0	335	407	390	345	655
V/C Ratio(X)	0.00	0.51	0.44	0.40	0.23	0.18
Avail Cap(c_a), veh/h	0	1307	1339	1281	1285	1491
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	12.9	11.8	11.7	11.9	6.5
Incr Delay (d2), s/veh	0.0	1.2	0.7	0.7	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		1.1	1.0	0.9	0.4	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	14.1	12.6	12.4	12.3	6.6
LnGrp LOS	A	B	B	B	B	A
Approach Vol, veh/h	171			334	195	
Approach Delay, s/veh	14.1			12.5	8.9	
Approach LOS	B			B	A	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		11.5		11.2		12.4
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		3.6		5.0		4.9
Green Ext Time (p_c), s		0.6		0.9		1.8

Intersection Summary

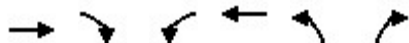
HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative 1830 PM  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	220	9	2	265	31	16
Future Volume (veh/h)	220	9	2	265	31	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	239	10	2	288	34	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	727	30	5	782	193	97
Arrive On Green	0.21	0.21	0.22	0.22	0.17	0.17
Sat Flow, veh/h	3570	145	24	3715	1120	560
Grp Volume(v), veh/h	122	127	156	134	52	0
Grp Sat Flow(s),veh/h/ln	1777	1844	1869	1777	1714	0
Q Serve(g_s), s	2.0	2.0	2.5	2.2	0.9	0.0
Cycle Q Clear(g_c), s	2.0	2.0	2.5	2.2	0.9	0.0
Prop In Lane		0.08	0.01		0.65	0.33
Lane Grp Cap(c), veh/h	372	386	404	384	295	0
V/C Ratio(X)	0.33	0.33	0.39	0.35	0.18	0.00
Avail Cap(c_a), veh/h	2058	2136	1359	1292	463	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.7	11.7	11.7	11.6	12.3	0.0
Incr Delay (d2), s/veh	0.5	0.5	0.6	0.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.7	0.9	0.7	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.2	12.2	12.3	12.1	12.6	0.0
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	249			290	52	
Approach Delay, s/veh	12.2			12.2	12.6	
Approach LOS	B			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		10.6		12.0		12.2
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		9.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		2.9		4.0		4.5
Green Ext Time (p_c), s		0.0		1.5		1.6

Intersection Summary

HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative 1830 PM  
 03/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↖		↖	↕	↗
Traffic Volume (veh/h)	1	34	116	26	16	50	61	230	36	100	288	1
Future Volume (veh/h)	1	34	116	26	16	50	61	230	36	100	288	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	37	126	28	17	54	66	250	39	109	313	1
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	214	306	108	65	151	134	362	56	149	862	3
Arrive On Green	0.12	0.12	0.12	0.10	0.10	0.10	0.08	0.23	0.23	0.08	0.24	0.24
Sat Flow, veh/h	49	1819	1585	1129	685	1585	1781	1580	246	1781	3634	12
Grp Volume(v), veh/h	38	0	126	45	0	54	66	0	289	109	153	161
Grp Sat Flow(s),veh/h/ln	1868	0	1585	1814	0	1585	1781	0	1826	1781	1777	1868
Q Serve(g_s), s	0.8	0.0	3.1	1.0	0.0	1.4	1.6	0.0	6.4	2.6	3.2	3.2
Cycle Q Clear(g_c), s	0.8	0.0	3.1	1.0	0.0	1.4	1.6	0.0	6.4	2.6	3.2	3.2
Prop In Lane	0.03		1.00	0.62		1.00	1.00		0.13	1.00		0.01
Lane Grp Cap(c), veh/h	220	0	306	173	0	151	134	0	418	149	421	443
V/C Ratio(X)	0.17	0.00	0.41	0.26	0.00	0.36	0.49	0.00	0.69	0.73	0.36	0.36
Avail Cap(c_a), veh/h	418	0	474	611	0	534	600	0	1333	278	976	1026
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.6	0.0	15.7	18.6	0.0	18.7	19.6	0.0	15.6	19.8	14.1	14.1
Incr Delay (d2), s/veh	0.4	0.0	0.9	0.8	0.0	1.4	2.8	0.0	2.0	6.8	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.0	0.4	0.0	0.5	0.7	0.0	2.5	1.3	1.1	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.0	0.0	16.5	19.4	0.0	20.2	22.4	0.0	17.7	26.6	14.6	14.6
LnGrp LOS	B	A	B	B	A	C	C	A	B	C	B	B
Approach Vol, veh/h		164			99			355			423	
Approach Delay, s/veh		16.9			19.8			18.6			17.7	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	15.8		10.3	8.4	16.2		9.3				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	32.3	32.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+14), s	14.6	8.4		5.1	3.6	5.2		3.4				
Green Ext Time (p_c), s	0.0	1.7		0.2	0.1	1.7		0.2				

Intersection Summary

HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↗	↗
Traffic Vol, veh/h	34	57	10	264	400	28
Future Vol, veh/h	34	57	10	264	400	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	62	11	287	435	30

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	759	233	465	0	-	0
Stage 1	450	-	-	-	-	-
Stage 2	309	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	358	770	1095	-	-	-
Stage 1	610	-	-	-	-	-
Stage 2	744	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	354	770	1095	-	-	-
Mov Cap-2 Maneuver	526	-	-	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	744	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1095	-	526	770	-	-
HCM Lane V/C Ratio	0.01	-	0.07	0.08	-	-
HCM Control Delay (s)	8.3	-	12.4	10.1	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	0.3	-	-

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	14	25	2	11	15	40	3	182	11	90	287	41
Future Vol, veh/h	14	25	2	11	15	40	3	182	11	90	287	41
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	27	2	12	16	43	3	198	12	98	312	45
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.1	8.9	10.3	11.7
HCM LOS	A	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	34%	17%	100%	0%
Vol Thru, %	0%	94%	61%	23%	0%	88%
Vol Right, %	0%	6%	5%	61%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	193	41	66	90	328
LT Vol	3	0	14	11	90	0
Through Vol	0	182	25	15	0	287
RT Vol	0	11	2	40	0	41
Lane Flow Rate	3	210	45	72	98	357
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.005	0.304	0.069	0.104	0.15	0.489
Departure Headway (Hd)	5.767	5.223	5.611	5.196	5.532	4.941
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	618	686	634	686	647	727
Service Time	3.523	2.979	3.682	3.259	3.278	2.688
HCM Lane V/C Ratio	0.005	0.306	0.071	0.105	0.151	0.491
HCM Control Delay	8.6	10.3	9.1	8.9	9.3	12.4
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0	1.3	0.2	0.3	0.5	2.7

Intersection						
Int Delay, s/veh	7.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	141	81	164	237	46
Future Vol, veh/h	25	141	81	164	237	46
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	153	88	178	258	50

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	88	0	-	0	295 88
Stage 1	-	-	-	-	88 -
Stage 2	-	-	-	-	207 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1508	-	-	0	696 970
Stage 1	-	-	-	0	935 -
Stage 2	-	-	-	0	828 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1508	-	-	-	683 970
Mov Cap-2 Maneuver	-	-	-	-	683 -
Stage 1	-	-	-	-	918 -
Stage 2	-	-	-	-	828 -

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1508	-	-	683	970
HCM Lane V/C Ratio	0.018	-	-	0.377	0.052
HCM Control Delay (s)	7.4	-	-	13.4	8.9
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.8	0.2

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative 1830 PM  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	105	41	3	90	47	12
Future Volume (veh/h)	105	41	3	90	47	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	114	45	3	98	51	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	473	401	9	807	302	77
Arrive On Green	0.25	0.25	0.00	0.43	0.22	0.22
Sat Flow, veh/h	1870	1585	1781	1870	1365	348
Grp Volume(v), veh/h	114	45	3	98	65	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1739	0
Q Serve(g_s), s	1.3	0.6	0.0	0.9	0.8	0.0
Cycle Q Clear(g_c), s	1.3	0.6	0.0	0.9	0.8	0.0
Prop In Lane		1.00	1.00		0.78	0.20
Lane Grp Cap(c), veh/h	473	401	9	807	385	0
V/C Ratio(X)	0.24	0.11	0.34	0.12	0.17	0.00
Avail Cap(c_a), veh/h	2093	1774	480	1748	983	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.1	7.8	13.4	4.6	8.5	0.0
Incr Delay (d2), s/veh	0.3	0.1	21.3	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.1	0.1	0.2	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.3	7.9	34.7	4.7	8.7	0.0
LnGrp LOS	A	A	C	A	A	A
Approach Vol, veh/h	159			101	65	
Approach Delay, s/veh	8.2			5.6	8.7	
Approach LOS	A			A	A	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		10.7	4.8	11.5		16.4
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		2.8	2.0	3.3		2.9
Green Ext Time (p_c), s		0.1	0.0	0.7		0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			7.5			
HCM 6th LOS			A			
<b>Notes</b>						
User approved pedestrian interval to be less than phase max green.						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	81	37	22	27	35	74
Future Vol, veh/h	81	37	22	27	35	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	40	24	29	38	80
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.2	7.3	7.8
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	69%	0%	100%	0%
Vol Thru, %	31%	45%	0%	0%
Vol Right, %	0%	55%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	118	49	35	74
LT Vol	81	0	35	0
Through Vol	37	22	0	0
RT Vol	0	27	0	74
Lane Flow Rate	128	53	38	80
Geometry Grp	2	2	7	7
Degree of Util (X)	0.154	0.06	0.058	0.095
Departure Headway (Hd)	4.413	4.022	5.449	4.245
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	818	895	661	849
Service Time	2.413	2.028	3.149	1.945
HCM Lane V/C Ratio	0.156	0.059	0.057	0.094
HCM Control Delay	8.2	7.3	8.5	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.2	0.2	0.3



**Intersection**

Intersection Delay, s/veh 10.4  
Intersection LOS B













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	78	155	153	120	50
Future Vol, veh/h	82	78	155	153	120	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	85	168	166	130	54
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.6	11.7	8.8
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	50%	51%	0%	0%
Vol Thru, %	50%	0%	100%	0%
Vol Right, %	0%	49%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	308	160	120	50
LT Vol	155	82	0	0
Through Vol	153	0	120	0
RT Vol	0	78	0	50
Lane Flow Rate	335	174	130	54
Geometry Grp	5	2	7	7
Degree of Util (X)	0.446	0.239	0.191	0.069
Departure Headway (Hd)	4.793	4.954	5.273	4.567
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	750	722	678	780
Service Time	2.84	3.009	3.026	2.32
HCM Lane V/C Ratio	0.447	0.241	0.192	0.069
HCM Control Delay	11.7	9.6	9.3	7.7
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2.3	0.9	0.7	0.2

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative 1830 PM  
 01/12/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	25	212	24	112	372
Future Volume (veh/h)	43	25	212	24	112	372
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	47	27	230	26	122	404
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	134	286	499	423	187	1015
Arrive On Green	0.08	0.08	0.27	0.27	0.11	0.56
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	47	27	230	26	122	404
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.7	0.4	3.1	0.4	2.0	3.7
Cycle Q Clear(g_c), s	0.7	0.4	3.1	0.4	2.0	3.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	134	286	499	423	187	1015
V/C Ratio(X)	0.35	0.09	0.46	0.06	0.65	0.40
Avail Cap(c_a), veh/h	841	915	1891	1603	1187	3081
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	9.9	8.8	7.8	12.5	3.7
Incr Delay (d2), s/veh	1.5	0.1	0.7	0.1	3.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.1	0.7	0.1	0.7	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.3	10.0	9.5	7.9	16.3	3.9
LnGrp LOS	B	A	A	A	B	A
Approach Vol, veh/h	74		256			526
Approach Delay, s/veh	12.7		9.3			6.8
Approach LOS	B		A			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.2	13.8			22.0	7.2
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	4.0	5.1			5.7	2.7
Green Ext Time (p_c), s	0.2	1.2			2.4	0.1
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.1			
HCM 6th LOS			A			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	11.8	21.3	5.6	11.7

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.8	0.0	0.2
Total Del/Veh (s)	4.5	7.6	18.7	9.0

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.1
Total Del/Veh (s)	17.7	7.3	11.1	11.0	9.8

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.9	0.7
Total Del/Veh (s)	8.4	12.6	13.4	36.2	16.1

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	4.5	23.5	8.9

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.5	0.0	0.5
Total Del/Veh (s)	9.8	17.3	14.2	3.8	10.7

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.8	2.9	1.4
Total Del/Veh (s)	10.3	10.8	5.9	8.7

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.0	0.0	0.1	0.3
Total Del/Veh (s)	7.6	8.4	8.9	8.2

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.2
Total Del/Veh (s)	6.6	8.0	1.0	4.4

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative 1830-1930 PM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	38	3.0	0.106	4.9	LOS A	0.4	11.3	0.46	0.35	0.46	34.2
8	T1	43	3.0	0.106	4.9	LOS A	0.4	11.3	0.46	0.35	0.46	34.1
18	R2	18	3.0	0.106	4.9	LOS A	0.4	11.3	0.46	0.35	0.46	33.2
Approach		99	3.0	0.106	4.9	LOS A	0.4	11.3	0.46	0.35	0.46	34.0
East: Idaho Maryland Rd												
1	L2	163	3.0	0.151	4.7	LOS A	0.6	15.8	0.38	0.27	0.38	32.7
6	T1	200	3.0	0.269	5.9	LOS A	1.2	31.5	0.43	0.32	0.43	34.7
16	R2	92	3.0	0.269	5.9	LOS A	1.2	31.5	0.43	0.32	0.43	33.6
Approach		455	3.0	0.269	5.4	LOS A	1.2	31.5	0.41	0.30	0.41	33.7
North: Main St												
7	L2	65	3.0	0.238	6.1	LOS A	1.0	24.6	0.48	0.41	0.48	33.9
4	T1	165	3.0	0.238	6.1	LOS A	1.0	24.6	0.48	0.41	0.48	33.9
14	R2	225	3.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		456	3.0	0.238	3.1	LOS A	1.0	24.6	0.24	0.21	0.24	35.4
West: Main St												
5	L2	176	3.0	0.312	6.9	LOS A	1.3	34.4	0.50	0.44	0.50	32.7
2	T1	106	3.0	0.312	6.9	LOS A	1.3	34.4	0.50	0.44	0.50	32.6
12	R2	23	3.0	0.312	6.9	LOS A	1.3	34.4	0.50	0.44	0.50	31.8
Approach		305	3.0	0.312	6.9	LOS A	1.3	34.4	0.50	0.44	0.50	32.6
All Vehicles		1314	3.0	0.312	4.9	LOS A	1.3	34.4	0.38	0.31	0.38	34.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Intersection	
Intersection Delay, s/veh	33.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	76	348	8	0	0	0	0	212	302	166	253	0
Future Vol, veh/h	76	348	8	0	0	0	0	212	302	166	253	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	83	378	9	0	0	0	0	230	328	180	275	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

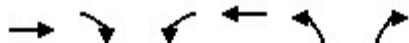
Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	17.7	61.4	16.6
HCM LOS	C	F	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	30%	0%	100%	0%
Vol Thru, %	41%	70%	96%	0%	100%
Vol Right, %	59%	0%	4%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	514	250	182	166	253
LT Vol	0	76	0	166	0
Through Vol	212	174	174	0	253
RT Vol	302	0	8	0	0
Lane Flow Rate	559	272	198	180	275
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.992	0.566	0.402	0.378	0.536
Departure Headway (Hd)	6.39	7.499	7.312	7.535	7.022
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	564	478	489	475	509
Service Time	4.467	5.286	5.099	5.335	4.822
HCM Lane V/C Ratio	0.991	0.569	0.405	0.379	0.54
HCM Control Delay	61.4	19.7	15	14.9	17.7
HCM Lane LOS	F	C	B	B	C
HCM 95th-tile Q	14.1	3.5	1.9	1.7	3.1



HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

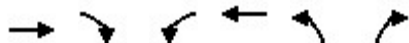
Cumulative plus Project AM Peak  
Centennial Site



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	331	42	58	401	255	546
Future Volume (veh/h)	331	42	58	401	255	546
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	356	45	62	431	274	587
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	425	54	87	638	587	839
Arrive On Green	0.26	0.26	0.20	0.20	0.33	0.33
Sat Flow, veh/h	1628	206	435	3284	1781	1585
Grp Volume(v), veh/h	0	401	263	230	274	587
Grp Sat Flow(s),veh/h/ln	0	1833	1849	1777	1781	1585
Q Serve(g_s), s	0.0	13.9	9.0	8.0	8.2	18.6
Cycle Q Clear(g_c), s	0.0	13.9	9.0	8.0	8.2	18.6
Prop In Lane		0.11	0.24		1.00	1.00
Lane Grp Cap(c), veh/h	0	479	370	355	587	839
V/C Ratio(X)	0.00	0.84	0.71	0.65	0.47	0.70
Avail Cap(c_a), veh/h	0	689	694	667	669	912
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	23.5	25.1	24.8	17.9	11.8
Incr Delay (d2), s/veh	0.0	6.1	2.6	2.0	0.6	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		6.4	4.0	3.4	3.2	9.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	29.7	27.7	26.7	18.5	14.0
LnGrp LOS	A	C	C	C	B	B
Approach Vol, veh/h	401			493	861	
Approach Delay, s/veh	29.7			27.2	15.4	
Approach LOS	C			C	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		26.9		22.3		18.2
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+I1), s		20.6		15.9		11.0
Green Ext Time (p_c), s		1.5		1.7		2.5
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			22.0			
HCM 6th LOS			C			
<b>Notes</b>						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project AM Peak  
Centennial Site



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	724	139	26	392	84	30
Future Volume (veh/h)	724	139	26	392	84	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	762	146	27	413	88	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	1172	224	44	711	127	46
Arrive On Green	0.39	0.39	0.21	0.21	0.10	0.10
Sat Flow, veh/h	3068	570	213	3517	1255	456
Grp Volume(v), veh/h	455	453	236	204	121	0
Grp Sat Flow(s),veh/h/ln	1777	1768	1860	1777	1725	0
Q Serve(g_s), s	9.8	9.8	5.4	4.9	3.2	0.0
Cycle Q Clear(g_c), s	9.8	9.8	5.4	4.9	3.2	0.0
Prop In Lane		0.32	0.11		0.73	0.26
Lane Grp Cap(c), veh/h	700	696	387	369	175	0
V/C Ratio(X)	0.65	0.65	0.61	0.55	0.69	0.00
Avail Cap(c_a), veh/h	1519	1512	998	954	381	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.6	11.6	16.9	16.7	20.5	0.0
Incr Delay (d2), s/veh	1.0	1.0	1.6	1.3	4.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	3.3	2.2	1.9	1.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.7	12.7	18.5	18.0	25.3	0.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	908			440	121	
Approach Delay, s/veh	12.7			18.3	25.3	
Approach LOS	B			B	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		9.4		23.3		14.5
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		10.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		5.2		11.8		7.4
Green Ext Time (p_c), s		0.1		6.7		2.4

Intersection Summary

HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project AM Peak  
 Centennial Site



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↖		↖	↕	↗
Traffic Volume (veh/h)	0	9	195	100	95	173	262	496	20	45	452	13
Future Volume (veh/h)	0	9	195	100	95	173	262	496	20	45	452	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	10	207	106	101	184	279	528	21	48	481	14
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	247	503	145	138	247	330	610	24	80	710	21
Arrive On Green	0.00	0.13	0.13	0.16	0.16	0.16	0.18	0.34	0.34	0.04	0.20	0.20
Sat Flow, veh/h	0	1870	1585	934	890	1585	1781	1787	71	1781	3526	103
Grp Volume(v), veh/h	0	10	207	207	0	184	279	0	549	48	242	253
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1824	0	1585	1781	0	1858	1781	1777	1852
Q Serve(g_s), s	0.0	0.3	6.6	7.0	0.0	7.1	9.8	0.0	17.8	1.7	8.1	8.1
Cycle Q Clear(g_c), s	0.0	0.3	6.6	7.0	0.0	7.1	9.8	0.0	17.8	1.7	8.1	8.1
Prop In Lane	0.00		1.00	0.51		1.00	1.00		0.04	1.00		0.06
Lane Grp Cap(c), veh/h	0	247	503	284	0	247	330	0	635	80	358	373
V/C Ratio(X)	0.00	0.04	0.41	0.73	0.00	0.75	0.85	0.00	0.86	0.60	0.68	0.68
Avail Cap(c_a), veh/h	0	287	537	421	0	366	412	0	844	191	670	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	24.4	17.3	25.9	0.0	26.0	25.4	0.0	19.8	30.2	23.8	23.8
Incr Delay (d2), s/veh	0.0	0.1	0.5	3.6	0.0	4.5	12.6	0.0	7.3	7.1	2.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0	0.0	0.1	2.2	3.1	0.0	0.3	4.8	0.0	7.7	0.8	3.2	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	24.5	17.8	29.5	0.0	30.5	38.0	0.0	27.1	37.3	26.0	26.0
LnGrp LOS	A	C	B	C	A	C	D	A	C	D	C	C
Approach Vol, veh/h		217			391			828			543	
Approach Delay, s/veh		18.1			30.0			30.8			27.0	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s8.0	27.7			13.6	17.0	18.7		15.1				
Change Period (Y+Rc), s 5.1	5.7			5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s 9	29.3			9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+13, s 7	19.8			8.6	11.8	10.1		9.1				
Green Ext Time (p_c), s 0.0	2.2			0.1	0.2	2.2		0.9				

Intersection Summary

HCM 6th Ctrl Delay	28.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	55	113	748	535	195
Future Vol, veh/h	33	55	113	748	535	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	60	123	813	582	212

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1747	397	794	0	-	0
Stage 1	688	-	-	-	-	-
Stage 2	1059	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	85	603	825	-	-	-
Stage 1	461	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	72	603	825	-	-	-
Mov Cap-2 Maneuver	249	-	-	-	-	-
Stage 1	392	-	-	-	-	-
Stage 2	332	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.5	1.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	825	-	249	603	-	-
HCM Lane V/C Ratio	0.149	-	0.144	0.099	-	-
HCM Control Delay (s)	10.1	-	21.9	11.6	-	-
HCM Lane LOS	B	-	C	B	-	-
HCM 95th %tile Q(veh)	0.5	-	0.5	0.3	-	-

Intersection	
Intersection Delay, s/veh	55.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	58	22	25	25	48	181	27	560	12	52	286	29
Future Vol, veh/h	58	22	25	25	48	181	27	560	12	52	286	29
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	24	27	27	52	195	29	602	13	56	308	31
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	13.6	17.1	99.8	20.2
HCM LOS	B	C	F	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	55%	10%	100%	0%
Vol Thru, %	0%	98%	21%	19%	0%	91%
Vol Right, %	0%	2%	24%	71%	0%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	27	572	105	254	52	315
LT Vol	27	0	58	25	52	0
Through Vol	0	560	22	48	0	286
RT Vol	0	12	25	181	0	29
Lane Flow Rate	29	615	113	273	56	339
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.058	1.13	0.239	0.507	0.115	0.641
Departure Headway (Hd)	7.141	6.615	8.094	7.067	7.725	7.144
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	498	547	446	513	467	508
Service Time	4.939	4.412	6.094	5.067	5.425	4.844
HCM Lane V/C Ratio	0.058	1.124	0.253	0.532	0.12	0.667
HCM Control Delay	10.4	104	13.6	17.1	11.4	21.7
HCM Lane LOS	B	F	B	C	B	C
HCM 95th-tile Q	0.2	20.1	0.9	2.8	0.4	4.5

Intersection						
Int Delay, s/veh	7.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	125	151	275	423	158	109
Future Vol, veh/h	125	151	275	423	158	109
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	133	161	293	450	168	116

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	293	0	-	0	720 293
Stage 1	-	-	-	-	293 -
Stage 2	-	-	-	-	427 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1269	-	-	0	395 746
Stage 1	-	-	-	0	757 -
Stage 2	-	-	-	0	658 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1269	-	-	-	354 746
Mov Cap-2 Maneuver	-	-	-	-	354 -
Stage 1	-	-	-	-	678 -
Stage 2	-	-	-	-	658 -

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	18.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1269	-	-	354	746
HCM Lane V/C Ratio	0.105	-	-	0.475	0.155
HCM Control Delay (s)	8.2	-	-	24	10.7
HCM Lane LOS	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	2.5	0.5

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	15	22	545	241	95
Future Vol, veh/h	54	15	22	545	241	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	16	23	568	251	99

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	915	301	350	0	-	0
Stage 1	301	-	-	-	-	-
Stage 2	614	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	303	739	1209	-	-	-
Stage 1	751	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	297	739	1209	-	-	-
Mov Cap-2 Maneuver	475	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1209	-	515	-	-
HCM Lane V/C Ratio	0.019	-	0.14	-	-
HCM Control Delay (s)	8	-	13.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	95	0	0	105	0	10
Future Vol, veh/h	95	0	0	105	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	0	0	114	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	103	0	217 103
Stage 1	-	-	-	-	103 -
Stage 2	-	-	-	-	114 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1489	-	771 952
Stage 1	-	-	-	-	921 -
Stage 2	-	-	-	-	911 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1489	-	771 952
Mov Cap-2 Maneuver	-	-	-	-	771 -
Stage 1	-	-	-	-	921 -
Stage 2	-	-	-	-	911 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	952	-	-	1489	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.8	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-



Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	420	0	8	112	0	0	0	8	2	0	0
Future Vol, veh/h	0	420	0	8	112	0	0	0	8	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	457	0	9	122	0	0	0	9	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	122	0	0	457	0	0	597	597	457	602	597	122
Stage 1	-	-	-	-	-	-	457	457	-	140	140	-
Stage 2	-	-	-	-	-	-	140	140	-	462	457	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1465	-	-	1104	-	-	415	416	604	412	416	929
Stage 1	-	-	-	-	-	-	583	568	-	863	781	-
Stage 2	-	-	-	-	-	-	863	781	-	580	568	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1465	-	-	1104	-	-	412	412	604	403	412	929
Mov Cap-2 Maneuver	-	-	-	-	-	-	412	412	-	403	412	-
Stage 1	-	-	-	-	-	-	583	568	-	863	774	-
Stage 2	-	-	-	-	-	-	855	774	-	572	568	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.6			11			14		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	604	1465	-	-	1104	-	-	403
HCM Lane V/C Ratio	0.014	-	-	-	0.008	-	-	0.005
HCM Control Delay (s)	11	0	-	-	8.3	0	-	14
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project AM Peak  
 Centennial Site



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	242	343	23	250	79	12
Future Volume (veh/h)	242	343	23	250	79	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	249	354	24	258	81	12
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	662	561	65	1041	167	25
Arrive On Green	0.35	0.35	0.04	0.56	0.11	0.11
Sat Flow, veh/h	1870	1585	1781	1870	1512	224
Grp Volume(v), veh/h	249	354	24	258	94	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1754	0
Q Serve(g_s), s	2.8	5.3	0.4	2.0	1.4	0.0
Cycle Q Clear(g_c), s	2.8	5.3	0.4	2.0	1.4	0.0
Prop In Lane		1.00	1.00		0.86	0.13
Lane Grp Cap(c), veh/h	662	561	65	1041	194	0
V/C Ratio(X)	0.38	0.63	0.37	0.25	0.48	0.00
Avail Cap(c_a), veh/h	2005	1699	460	1674	949	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.8	7.6	13.3	3.2	11.8	0.0
Incr Delay (d2), s/veh	0.4	1.2	3.5	0.1	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.2	0.2	0.2	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.2	8.8	16.8	3.3	13.7	0.0
LnGrp LOS	A	A	B	A	B	A
Approach Vol, veh/h	603			282	94	
Approach Delay, s/veh	8.1			4.5	13.7	
Approach LOS	A			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		7.8	5.7	14.7		20.4
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		3.4	2.4	7.3		4.0
Green Ext Time (p_c), s		0.2	0.0	2.8		1.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			7.6			
HCM 6th LOS			A			
<b>Notes</b>						
User approved pedestrian interval to be less than phase max green.						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	117	128	156	138	50	121
Future Vol, veh/h	117	128	156	138	50	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	139	170	150	54	132
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	10.7	10.4	9.3
HCM LOS	B	B	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	48%	0%	100%	0%
Vol Thru, %	52%	53%	0%	0%
Vol Right, %	0%	47%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	294	50	121
LT Vol	117	0	50	0
Through Vol	128	156	0	0
RT Vol	0	138	0	121
Lane Flow Rate	266	320	54	132
Geometry Grp	2	2	7	7
Degree of Util (X)	0.36	0.396	0.096	0.188
Departure Headway (Hd)	4.87	4.461	6.349	5.136
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	735	802	561	693
Service Time	2.926	2.511	4.126	2.912
HCM Lane V/C Ratio	0.362	0.399	0.096	0.19
HCM Control Delay	10.7	10.4	9.8	9.1
HCM Lane LOS	B	B	A	A
HCM 95th-tile Q	1.6	1.9	0.3	0.7

Intersection	
Intersection Delay, s/veh	19.5
Intersection LOS	C













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	89	337	209	202	151	72
Future Vol, veh/h	89	337	209	202	151	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	366	227	220	164	78
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB		
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	20	23.5	11.3
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	51%	21%	0%	0%
Vol Thru, %	49%	0%	100%	0%
Vol Right, %	0%	79%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	411	426	151	72
LT Vol	209	89	0	0
Through Vol	202	0	151	0
RT Vol	0	337	0	72
Lane Flow Rate	447	463	164	78
Geometry Grp	5	2	7	7
Degree of Util (X)	0.732	0.696	0.301	0.128
Departure Headway (Hd)	5.902	5.412	6.6	5.885
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	612	662	542	605
Service Time	3.964	3.479	4.381	3.665
HCM Lane V/C Ratio	0.73	0.699	0.303	0.129
HCM Control Delay	23.5	20	12.2	9.5
HCM Lane LOS	C	C	B	A
HCM 95th-tile Q	6.3	5.6	1.3	0.4

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project AM Peak  
 Centennial Site

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	195	650	148	296	314
Future Volume (veh/h)	59	195	650	148	296	314
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	64	212	707	161	322	341
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	239	544	763	647	373	1290
Arrive On Green	0.14	0.14	0.42	0.42	0.21	0.71
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	64	212	707	161	322	341
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	2.3	7.1	25.2	4.6	12.2	4.6
Cycle Q Clear(g_c), s	2.3	7.1	25.2	4.6	12.2	4.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	239	544	763	647	373	1290
V/C Ratio(X)	0.27	0.39	0.93	0.25	0.86	0.26
Avail Cap(c_a), veh/h	358	650	804	682	505	1311
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	16.7	18.9	13.0	26.0	3.6
Incr Delay (d2), s/veh	0.6	0.5	16.2	0.2	11.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.4	12.1	1.4	5.7	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.1	17.2	35.1	13.2	37.2	3.7
LnGrp LOS	C	B	D	B	D	A
Approach Vol, veh/h	276		868			663
Approach Delay, s/veh	19.5		31.0			20.0
Approach LOS	B		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	19.8	34.4			54.2	14.3
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	14.2	27.2			6.6	9.1
Green Ext Time (p_c), s	0.5	1.4			2.0	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			25.2			
HCM 6th LOS			C			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	11.1	52.1	7.3	24.2

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	1.3	0.0	0.6
Total Del/Veh (s)	6.0	9.4	19.3	11.5

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.6	1.9	1.0
Total Del/Veh (s)	17.7	9.1	13.3	13.7	11.8

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.5	2.7	0.8
Total Del/Veh (s)	11.2	12.9	15.1	36.6	19.1

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	7.0	7.2	25.3	12.6

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.5	0.0	0.3
Total Del/Veh (s)	11.8	20.9	17.8	5.4	13.8

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	2.2	1.2
Total Del/Veh (s)	14.9	17.5	12.0	13.8

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.4	0.0	0.2	0.4
Total Del/Veh (s)	12.6	7.1	12.0	9.6

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.2
Total Del/Veh (s)	9.5	10.4	1.1	7.1



# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative plus Project AM Peak  
To Centennial  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	30	3.0	0.276	8.8	LOS A	1.2	29.8	0.65	0.65	0.65	32.8
8	T1	63	3.0	0.276	8.8	LOS A	1.2	29.8	0.65	0.65	0.65	32.8
18	R2	90	3.0	0.276	8.8	LOS A	1.2	29.8	0.65	0.65	0.65	31.8
Approach		183	3.0	0.276	8.8	LOS A	1.2	29.8	0.65	0.65	0.65	32.3
East: Idaho Maryland Rd												
1	L2	264	3.0	0.283	6.8	LOS A	1.2	31.7	0.53	0.47	0.53	31.7
6	T1	163	3.0	0.458	9.3	LOS A	2.7	70.2	0.61	0.62	0.73	32.9
16	R2	264	3.0	0.458	9.3	LOS A	2.7	70.2	0.61	0.62	0.73	31.9
Approach		692	3.0	0.458	8.4	LOS A	2.7	70.2	0.58	0.56	0.65	32.0
North: Main St												
7	L2	143	3.0	0.368	8.0	LOS A	1.6	41.6	0.56	0.53	0.56	32.6
4	T1	197	3.0	0.368	8.0	LOS A	1.6	41.6	0.56	0.53	0.56	32.6
14	R2	209	3.0	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		549	3.0	0.368	5.0	LOS A	1.6	41.6	0.35	0.33	0.35	34.2
West: Main St												
5	L2	321	3.0	0.664	16.0	LOS B	6.2	159.5	0.78	1.02	1.47	28.9
2	T1	202	3.0	0.664	16.0	LOS B	6.2	159.5	0.78	1.02	1.47	28.9
12	R2	16	3.0	0.664	16.0	LOS B	6.2	159.5	0.78	1.02	1.47	28.2
Approach		539	3.0	0.664	16.0	LOS B	6.2	159.5	0.78	1.02	1.47	28.9
All Vehicles		1963	3.0	0.664	9.6	LOS A	6.2	159.5	0.58	0.63	0.79	31.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	21
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	79	324	5	0	0	0	0	132	168	177	389	0
Future Vol, veh/h	79	324	5	0	0	0	0	132	168	177	389	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	360	6	0	0	0	0	147	187	197	432	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	16.6	19.2	25.1
HCM LOS	C	C	D

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	33%	0%	100%	0%
Vol Thru, %	44%	67%	97%	0%	100%
Vol Right, %	56%	0%	3%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	300	241	167	177	389
LT Vol	0	79	0	177	0
Through Vol	132	162	162	0	389
RT Vol	168	0	5	0	0
Lane Flow Rate	333	268	186	197	432
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.605	0.542	0.366	0.388	0.791
Departure Headway (Hd)	6.531	7.292	7.103	7.098	6.589
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	550	493	505	505	549
Service Time	4.599	5.064	4.875	4.871	4.361
HCM Lane V/C Ratio	0.605	0.544	0.368	0.39	0.787
HCM Control Delay	19.2	18.4	14	14.3	30
HCM Lane LOS	C	C	B	B	D
HCM 95th-tile Q	4	3.2	1.7	1.8	7.4

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project PM Peak  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	267	38	80	840	150	266
Future Volume (veh/h)	267	38	80	840	150	266
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	297	42	89	933	167	296
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	376	53	110	1209	295	838
Arrive On Green	0.23	0.23	0.36	0.36	0.17	0.17
Sat Flow, veh/h	1603	227	302	3423	1781	1585
Grp Volume(v), veh/h	0	339	546	476	167	296
Grp Sat Flow(s),veh/h/ln	0	1830	1855	1777	1781	1585
Q Serve(g_s), s	0.0	10.4	15.8	13.9	5.1	6.4
Cycle Q Clear(g_c), s	0.0	10.4	15.8	13.9	5.1	6.4
Prop In Lane		0.12	0.16		1.00	1.00
Lane Grp Cap(c), veh/h	0	429	674	645	295	838
V/C Ratio(X)	0.00	0.79	0.81	0.74	0.57	0.35
Avail Cap(c_a), veh/h	0	778	789	755	757	1249
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.4	17.1	16.5	22.9	8.1
Incr Delay (d2), s/veh	0.0	3.3	5.6	3.2	1.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		4.5	7.0	5.5	2.1	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	24.7	22.7	19.7	24.6	8.4
LnGrp LOS	A	C	C	B	C	A
Approach Vol, veh/h	339			1022	463	
Approach Delay, s/veh	24.7			21.3	14.2	
Approach LOS	C			C	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		14.6		18.7		26.3
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+I1), s		8.4		12.4		17.8
Green Ext Time (p_c), s		1.4		1.6		3.8

Intersection Summary

HCM 6th Ctrl Delay	20.1
HCM 6th LOS	C

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project PM Peak  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	513	77	26	809	108	35
Future Volume (veh/h)	513	77	26	809	108	35
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	590	89	30	930	124	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	875	132	38	1237	166	54
Arrive On Green	0.28	0.28	0.35	0.35	0.13	0.13
Sat Flow, veh/h	3191	466	109	3626	1300	419
Grp Volume(v), veh/h	338	341	514	446	165	0
Grp Sat Flow(s),veh/h/ln1777	1786	1865	1777	1730	0	
Q Serve(g_s), s	9.8	9.9	14.5	12.7	5.4	0.0
Cycle Q Clear(g_c), s	9.8	9.9	14.5	12.7	5.4	0.0
Prop In Lane		0.26	0.06		0.75	0.24
Lane Grp Cap(c), veh/h	502	505	653	622	221	0
V/C Ratio(X)	0.67	0.68	0.79	0.72	0.75	0.00
Avail Cap(c_a), veh/h	1225	1232	807	769	278	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.6	18.6	17.0	16.5	24.6	0.0
Incr Delay (d2), s/veh	1.6	1.6	4.2	2.4	8.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln3.9		3.9	6.2	5.0	2.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.2	20.2	21.2	18.9	32.7	0.0
LnGrp LOS	C	C	C	B	C	A
Approach Vol, veh/h	679			960	165	
Approach Delay, s/veh	20.2			20.2	32.7	
Approach LOS	C			C	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		12.1		21.2		25.2
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		9.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		7.4		11.9		16.5
Green Ext Time (p_c), s		0.1		4.6		4.0

Intersection Summary

HCM 6th Ctrl Delay	21.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project PM Peak  
 03/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗		↖ ↗	↖ ↗	
Traffic Volume (veh/h)	3	71	254	28	34	106	273	607	77	147	526	15
Future Volume (veh/h)	3	71	254	28	34	106	273	607	77	147	526	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	73	262	29	35	109	281	626	79	152	542	15
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	233	492	79	95	151	322	666	84	161	1126	31
Arrive On Green	0.13	0.13	0.13	0.10	0.10	0.10	0.18	0.41	0.41	0.09	0.32	0.32
Sat Flow, veh/h	74	1793	1585	829	1000	1585	1781	1628	205	1781	3532	98
Grp Volume(v), veh/h	76	0	262	64	0	109	281	0	705	152	272	285
Grp Sat Flow(s),veh/h/ln1867	0	1585	1829	0	1585	1781	0	1833	1781	1777	1853	
Q Serve(g_s), s	2.8	0.0	9.9	2.5	0.0	5.1	11.7	0.0	28.2	6.5	9.4	9.4
Cycle Q Clear(g_c), s	2.8	0.0	9.9	2.5	0.0	5.1	11.7	0.0	28.2	6.5	9.4	9.4
Prop In Lane	0.04		1.00	0.45		1.00	1.00		0.11	1.00		0.05
Lane Grp Cap(c), veh/h	242	0	492	174	0	151	322	0	750	161	566	591
V/C Ratio(X)	0.31	0.00	0.53	0.37	0.00	0.72	0.87	0.00	0.94	0.94	0.48	0.48
Avail Cap(c_a), veh/h	242	0	492	357	0	310	348	0	777	161	566	591
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	21.7	32.3	0.0	33.5	30.4	0.0	21.6	34.5	20.9	20.9
Incr Delay (d2), s/veh	0.7	0.0	1.1	1.3	0.0	6.4	19.9	0.0	19.0	54.1	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.3	0.0	0.0	3.8	1.1	0.0	2.2	6.6	0.0	15.0	5.1	3.8	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	0.0	22.8	33.6	0.0	39.9	50.3	0.0	40.6	88.6	21.5	21.5
LnGrp LOS	C	A	C	C	A	D	D	A	D	F	C	C
Approach Vol, veh/h		338			173			986			709	
Approach Delay, s/veh		24.6			37.6			43.4			35.9	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	2.0	36.9		15.0	18.9	30.0		12.4				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9.9	32.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+1.5), s	19.5	30.2		11.9	13.7	11.4		7.1				
Green Ext Time (p_c), s	0.0	1.0		0.0	0.1	2.8		0.4				

Intersection Summary

HCM 6th Ctrl Delay	37.6
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	5.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	193	99	37	762	715	87
Future Vol, veh/h	193	99	37	762	715	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	203	104	39	802	753	92

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1679	423	845	0	-	0
Stage 1	799	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 95	580	789	-	-	-
Stage 1	404	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 90	580	789	-	-	-
Mov Cap-2 Maneuver	277	-	-	-	-	-
Stage 1	384	-	-	-	-	-
Stage 2	404	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	35.2	0.5	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	789	-	277	580	-	-
HCM Lane V/C Ratio	0.049	-	0.733	0.18	-	-
HCM Control Delay (s)	9.8	-	46.8	12.6	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	5.3	0.7	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	49.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	33	24	27	23	40	79	22	406	34	151	574	77
Future Vol, veh/h	33	24	27	23	40	79	22	406	34	151	574	77
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	24	27	23	40	80	22	410	34	153	580	78
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	12	12.7	27.3	72.2
HCM LOS	B	B	D	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	39%	16%	100%	0%
Vol Thru, %	0%	92%	29%	28%	0%	88%
Vol Right, %	0%	8%	32%	56%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	440	84	142	151	651
LT Vol	22	0	33	23	151	0
Through Vol	0	406	24	40	0	574
RT Vol	0	34	27	79	0	77
Lane Flow Rate	22	444	85	143	153	658
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.042	0.777	0.17	0.272	0.277	1.088
Departure Headway (Hd)	7.049	6.485	7.515	7.07	6.549	5.957
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	511	560	480	512	548	612
Service Time	4.749	4.185	5.515	5.07	4.294	3.702
HCM Lane V/C Ratio	0.043	0.793	0.177	0.279	0.279	1.075
HCM Control Delay	10.1	28.2	12	12.7	11.8	86.2
HCM Lane LOS	B	D	B	B	B	F
HCM 95th-tile Q	0.1	7.1	0.6	1.1	1.1	19.3

Intersection						
Int Delay, s/veh	61.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	86	238	245	277	422	124
Future Vol, veh/h	86	238	245	277	422	124
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	93	259	266	301	459	135

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	266	0	-	0	711 266
Stage 1	-	-	-	-	266 -
Stage 2	-	-	-	-	445 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1298	-	-	0 ~ 400	773
Stage 1	-	-	-	0	779 -
Stage 2	-	-	-	0	646 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1298	-	-	- ~ 371	773
Mov Cap-2 Maneuver	-	-	-	- ~ 371	-
Stage 1	-	-	-	-	723 -
Stage 2	-	-	-	-	646 -

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	125
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1298	-	-	371	773
HCM Lane V/C Ratio	0.072	-	-	1.236	0.174
HCM Control Delay (s)	8	-	-	158.6	10.6
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	19.7	0.6

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	22	15	378	561	64
Future Vol, veh/h	85	22	15	378	561	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	24	16	411	610	70

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1088	645	680	0	0
Stage 1	645	-	-	-	-
Stage 2	443	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	239	472	912	-	-
Stage 1	522	-	-	-	-
Stage 2	647	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	235	472	912	-	-
Mov Cap-2 Maneuver	430	-	-	-	-
Stage 1	513	-	-	-	-
Stage 2	647	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	912	-	438	-	-
HCM Lane V/C Ratio	0.018	-	0.266	-	-
HCM Control Delay (s)	9	-	16.2	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	75	0	0	138	0	10
Future Vol, veh/h	75	0	0	138	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	82	0	0	150	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	82	0	232 82
Stage 1	-	-	-	-	82 -
Stage 2	-	-	-	-	150 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1515	-	756 978
Stage 1	-	-	-	-	941 -
Stage 2	-	-	-	-	878 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1515	-	756 978
Mov Cap-2 Maneuver	-	-	-	-	756 -
Stage 1	-	-	-	-	941 -
Stage 2	-	-	-	-	878 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	978	-	-	1515	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	148	0	8	357	0	0	0	8	0	0	0
Future Vol, veh/h	0	148	0	8	357	0	0	0	8	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	197	0	11	476	0	0	0	11	0	0	0

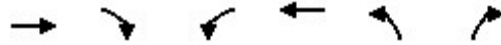
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	476	0	0	197	0	0	695	695	197	701	695	476
Stage 1	-	-	-	-	-	-	197	197	-	498	498	-
Stage 2	-	-	-	-	-	-	498	498	-	203	197	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1086	-	-	1376	-	-	357	366	844	353	366	589
Stage 1	-	-	-	-	-	-	805	738	-	554	544	-
Stage 2	-	-	-	-	-	-	554	544	-	799	738	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1086	-	-	1376	-	-	354	362	844	346	362	589
Mov Cap-2 Maneuver	-	-	-	-	-	-	354	362	-	346	362	-
Stage 1	-	-	-	-	-	-	805	738	-	554	538	-
Stage 2	-	-	-	-	-	-	548	538	-	789	738	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	9.3	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	844	1086	-	-	1376	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-	0.008	-	-	-
HCM Control Delay (s)	9.3	0	-	-	7.6	0	-	0
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project PM Peak  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	348	146	13	410	332	37
Future Volume (veh/h)	348	146	13	410	332	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	435	182	16	512	415	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	617	523	43	874	485	54
Arrive On Green	0.33	0.33	0.02	0.47	0.31	0.31
Sat Flow, veh/h	1870	1585	1781	1870	1581	175
Grp Volume(v), veh/h	435	182	16	512	462	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1760	0
Q Serve(g_s), s	8.5	3.6	0.4	8.4	10.3	0.0
Cycle Q Clear(g_c), s	8.5	3.6	0.4	8.4	10.3	0.0
Prop In Lane		1.00	1.00		0.90	0.10
Lane Grp Cap(c), veh/h	617	523	43	874	540	0
V/C Ratio(X)	0.70	0.35	0.37	0.59	0.85	0.00
Avail Cap(c_a), veh/h	1361	1153	312	1136	646	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.2	10.6	20.0	8.1	13.6	0.0
Incr Delay (d2), s/veh	1.5	0.4	5.2	0.6	9.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	1.1	0.2	2.5	4.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	11.0	25.2	8.8	23.0	0.0
LnGrp LOS	B	B	C	A	C	A
Approach Vol, veh/h	617			528	462	
Approach Delay, s/veh	12.9			9.3	23.0	
Approach LOS	B			A	C	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		17.5	5.7	18.4		24.2
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		12.3	2.4	10.5		10.4
Green Ext Time (p_c), s		0.5	0.0	3.3		2.9
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.6			
HCM 6th LOS			B			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	18.7
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	244	140	208	100	163	230
Future Vol, veh/h	244	140	208	100	163	230
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	287	165	245	118	192	271
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	24.7	16.8	14.2
HCM LOS	C	C	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	64%	0%	100%	0%
Vol Thru, %	36%	68%	0%	0%
Vol Right, %	0%	32%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	384	308	163	230
LT Vol	244	0	163	0
Through Vol	140	208	0	0
RT Vol	0	100	0	230
Lane Flow Rate	452	362	192	271
Geometry Grp	2	2	7	7
Degree of Util (X)	0.748	0.585	0.388	0.456
Departure Headway (Hd)	5.963	5.814	7.292	6.068
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	616	491	590
Service Time	4.027	3.884	5.062	3.837
HCM Lane V/C Ratio	0.747	0.588	0.391	0.459
HCM Control Delay	24.7	16.8	14.7	13.9
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	6.6	3.8	1.8	2.4

**Intersection**

Intersection Delay, s/veh 79.9  
Intersection LOS F













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	RT			LT	LT	RT
Traffic Vol, veh/h	133	444	429	418	379	139
Future Vol, veh/h	133	444	429	418	379	139
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	160	535	517	504	457	167
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	163.7	495.2	57.2
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	51%	23%	0%	0%
Vol Thru, %	49%	0%	100%	0%
Vol Right, %	0%	77%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	847	577	379	139
LT Vol	429	133	0	0
Through Vol	418	0	379	0
RT Vol	0	444	0	139
Lane Flow Rate	1020	695	457	167
Geometry Grp	5	2	7	7
Degree of Util (X)	2.042	1.272	0.968	0.322
Departure Headway (Hd)	8.031	8.061	10.052	9.313
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	459	459	365	389
Service Time	6.031	6.061	7.752	7.013
HCM Lane V/C Ratio	2.222	1.514	1.252	0.429
HCM Control Delay	495.2	163.7	72.1	16.4
HCM Lane LOS	F	F	F	C
HCM 95th-tile Q	63.8	24	10.7	1.4

HCM 6th Signalized Intersection Summary  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project PM Peak  
Centennial Site

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	157	363	470	48	132	627
Future Volume (veh/h)	157	363	470	48	132	627
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	171	395	511	52	143	682
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	446	564	625	530	187	995
Arrive On Green	0.26	0.26	0.34	0.34	0.11	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	171	395	511	52	143	682
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	4.4	11.7	13.8	1.2	4.3	14.6
Cycle Q Clear(g_c), s	4.4	11.7	13.8	1.2	4.3	14.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	446	564	625	530	187	995
V/C Ratio(X)	0.38	0.70	0.82	0.10	0.76	0.69
Avail Cap(c_a), veh/h	455	572	1023	867	642	1667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	14.6	16.2	12.1	23.4	8.9
Incr Delay (d2), s/veh	0.5	3.7	2.7	0.1	6.3	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.1	4.9	0.3	1.9	3.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.1	18.4	18.9	12.1	29.7	9.8
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	566		563			825
Approach Delay, s/veh	18.0		18.3			13.2
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.9	24.3			35.2	18.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.3	15.8			16.6	13.7
Green Ext Time (p_c), s	0.3	2.7			4.7	0.1
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			16.0			
HCM 6th LOS			B			





1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.1	0.3	0.0	0.1
Total Del/Veh (s)	17.2	136.3	15.3	48.8

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.0	0.0	0.4
Total Del/Veh (s)	6.3	9.0	27.7	14.0

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.6	2.1	1.2
Total Del/Veh (s)	21.5	12.0	18.8	19.8	16.5

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.7	0.7
Total Del/Veh (s)	15.2	15.1	22.3	36.7	21.0

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	9.4	9.9	29.7	14.5

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.7	0.0	0.6
Total Del/Veh (s)	21.7	42.1	47.7	15.9	32.2

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.8	2.7	1.0
Total Del/Veh (s)	13.8	14.0	19.0	15.2

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	0.1	0.2	0.7
Total Del/Veh (s)	22.9	13.7	21.4	18.6

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.5	0.3
Total Del/Veh (s)	15.5	11.1	2.0	9.7

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative plus Project PM Peak  
To Centennial  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	72	3.0	0.293	7.6	LOS A	1.3	34.4	0.59	0.55	0.59	33.1
8	T1	81	3.0	0.293	7.6	LOS A	1.3	34.4	0.59	0.55	0.59	33.0
18	R2	89	3.0	0.293	7.6	LOS A	1.3	34.4	0.59	0.55	0.59	32.1
Approach		242	3.0	0.293	7.6	LOS A	1.3	34.4	0.59	0.55	0.59	32.7
East: Idaho Maryland Rd												
1	L2	402	3.0	0.417	8.5	LOS A	2.1	53.3	0.58	0.52	0.58	31.0
6	T1	319	3.0	0.567	11.3	LOS B	4.9	126.7	0.67	0.74	0.97	32.0
16	R2	232	3.0	0.567	11.3	LOS B	4.9	126.7	0.67	0.74	0.97	31.1
Approach		953	3.0	0.567	10.1	LOS B	4.9	126.7	0.63	0.65	0.80	31.4
North: Main St												
7	L2	94	3.0	0.465	12.0	LOS B	2.5	63.7	0.70	0.80	1.02	31.2
4	T1	226	3.0	0.465	12.0	LOS B	2.5	63.7	0.70	0.80	1.02	31.1
14	R2	354	3.0	0.218	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		674	3.0	0.465	5.7	LOS A	2.5	63.7	0.33	0.38	0.48	34.0
West: Main St												
5	L2	229	3.0	0.543	13.3	LOS B	3.5	90.2	0.72	0.87	1.17	30.0
2	T1	136	3.0	0.543	13.3	LOS B	3.5	90.2	0.72	0.87	1.17	29.9
12	R2	33	3.0	0.543	13.3	LOS B	3.5	90.2	0.72	0.87	1.17	29.2
Approach		398	3.0	0.543	13.3	LOS B	3.5	90.2	0.72	0.87	1.17	29.9
All Vehicles		2266	3.0	0.567	9.1	LOS A	4.9	126.7	0.55	0.60	0.75	31.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\31-35 CPP Centennial\7.2.3 CPP Centennial PM Peak Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	20	107	6	0	0	0	0	103	119	101	103	0
Future Vol, veh/h	20	107	6	0	0	0	0	103	119	101	103	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	116	7	0	0	0	0	112	129	110	112	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9.2	10.3	9.2
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	27%	0%	100%	0%
Vol Thru, %	46%	73%	90%	0%	100%
Vol Right, %	54%	0%	10%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	222	74	60	101	103
LT Vol	0	20	0	101	0
Through Vol	103	54	54	0	103
RT Vol	119	0	6	0	0
Lane Flow Rate	241	80	65	110	112
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.327	0.129	0.1	0.173	0.16
Departure Headway (Hd)	4.881	5.796	5.588	5.657	5.154
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	736	617	639	633	695
Service Time	2.919	3.549	3.34	3.397	2.894
HCM Lane V/C Ratio	0.327	0.13	0.102	0.174	0.161
HCM Control Delay	10.3	9.4	9	9.6	8.9
HCM Lane LOS	B	A	A	A	A
HCM 95th-tile Q	1.4	0.4	0.3	0.6	0.6

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	214	15	44	197	119	424
Future Volume (veh/h)	214	15	44	197	119	424
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	233	16	48	214	129	461
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	332	23	112	531	539	762
Arrive On Green	0.19	0.19	0.18	0.18	0.30	0.30
Sat Flow, veh/h	1730	119	630	3079	1781	1585
Grp Volume(v), veh/h	0	249	140	122	129	461
Grp Sat Flow(s),veh/h/ln	0	1849	1839	1777	1781	1585
Q Serve(g_s), s	0.0	5.4	2.9	2.6	2.3	9.2
Cycle Q Clear(g_c), s	0.0	5.4	2.9	2.6	2.3	9.2
Prop In Lane		0.06	0.34		1.00	1.00
Lane Grp Cap(c), veh/h	0	355	327	316	539	762
V/C Ratio(X)	0.00	0.70	0.43	0.39	0.24	0.61
Avail Cap(c_a), veh/h	0	1087	1081	1045	1047	1214
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	16.2	15.7	15.6	11.3	8.2
Incr Delay (d2), s/veh	0.0	2.5	0.9	0.8	0.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr	0.0	2.2	1.1	1.0	0.8	3.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	18.8	16.6	16.4	11.5	9.0
LnGrp LOS	A	B	B	B	B	A
Approach Vol, veh/h	249			262	590	
Approach Delay, s/veh	18.8			16.5	9.5	
Approach LOS	B			B	A	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		17.7		13.0		12.4
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		11.2		7.4		4.9
Green Ext Time (p_c), s		1.9		1.3		1.4

Intersection Summary

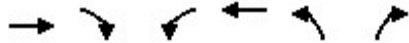
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	577	77	24	206	45	7
Future Volume (veh/h)	577	77	24	206	45	7
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	627	84	26	224	49	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	1104	148	72	652	108	18
Arrive On Green	0.35	0.35	0.20	0.20	0.07	0.07
Sat Flow, veh/h	3244	421	360	3363	1481	242
Grp Volume(v), veh/h	353	358	134	116	58	0
Grp Sat Flow(s),veh/h/ln1777	1795	1852	1777	1753	0	
Q Serve(g_s), s	6.0	6.0	2.3	2.1	1.2	0.0
Cycle Q Clear(g_c), s	6.0	6.0	2.3	2.1	1.2	0.0
Prop In Lane		0.23	0.19		0.84	0.14
Lane Grp Cap(c), veh/h	622	629	369	354	128	0
V/C Ratio(X)	0.57	0.57	0.36	0.33	0.45	0.00
Avail Cap(c_a), veh/h	1931	1950	1264	1212	492	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.8	9.8	12.8	12.7	16.5	0.0
Incr Delay (d2), s/veh	0.8	0.8	0.6	0.5	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.8	1.8	1.8	0.8	0.7	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.6	10.6	13.4	13.3	19.0	0.0
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	711			250	58	
Approach Delay, s/veh	10.6			13.3	19.0	
Approach LOS	B			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		7.3		17.7		12.1
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		10.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		3.2		8.0		4.3
Green Ext Time (p_c), s		0.1		5.0		1.3

Intersection Summary

HCM 6th Ctrl Delay	11.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
 03/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↖		↖	↕	↖
Traffic Volume (veh/h)	0	5	147	74	50	89	137	241	11	13	296	5
Future Volume (veh/h)	0	5	147	74	50	89	137	241	11	13	296	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	5	160	80	54	97	149	262	12	14	322	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	220	365	136	92	199	201	483	22	32	636	10
Arrive On Green	0.00	0.12	0.12	0.13	0.13	0.13	0.11	0.27	0.27	0.02	0.18	0.18
Sat Flow, veh/h	0	1870	1585	1084	732	1585	1781	1774	81	1781	3582	56
Grp Volume(v), veh/h	0	5	160	134	0	97	149	0	274	14	160	167
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1816	0	1585	1781	0	1856	1781	1777	1860
Q Serve(g_s), s	0.0	0.1	3.9	3.1	0.0	2.6	3.6	0.0	5.7	0.4	3.7	3.7
Cycle Q Clear(g_c), s	0.0	0.1	3.9	3.1	0.0	2.6	3.6	0.0	5.7	0.4	3.7	3.7
Prop In Lane	0.00		1.00	0.60		1.00	1.00		0.04	1.00		0.03
Lane Grp Cap(c), veh/h	0	220	365	229	0	199	201	0	505	32	316	330
V/C Ratio(X)	0.00	0.02	0.44	0.59	0.00	0.49	0.74	0.00	0.54	0.44	0.51	0.51
Avail Cap(c_a), veh/h	0	411	527	601	0	525	590	0	1208	273	959	1004
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	17.6	14.8	18.6	0.0	18.3	19.3	0.0	14.0	21.9	16.7	16.7
Incr Delay (d2), s/veh	0.0	0.0	0.8	2.4	0.0	1.8	5.4	0.0	0.9	9.3	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0	0.0	0.0	1.2	1.3	0.0	0.9	1.5	0.0	1.9	0.2	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.6	15.7	21.0	0.0	20.2	24.7	0.0	14.9	31.2	18.0	17.9
LnGrp LOS	A	B	B	C	A	C	C	A	B	C	B	B
Approach Vol, veh/h		165			231			423			341	
Approach Delay, s/veh		15.7			20.6			18.3			18.5	
Approach LOS		B			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s5.9	18.0			10.4	10.2	13.7		10.8				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	29.3			9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+1/2), s	7.7			5.9	5.6	5.7		5.1				
Green Ext Time (p_c), s	0.0	1.4		0.2	0.2	1.5		0.7				

Intersection Summary

HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	38	64	370	388	98
Future Vol, veh/h	20	38	64	370	388	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	41	70	402	422	107

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1018	265	529	0	-	0
Stage 1	476	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	248	734	1036	-	-	-
Stage 1	592	-	-	-	-	-
Stage 2	582	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	231	734	1036	-	-	-
Mov Cap-2 Maneuver	431	-	-	-	-	-
Stage 1	552	-	-	-	-	-
Stage 2	582	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1036	-	431	734	-	-
HCM Lane V/C Ratio	0.067	-	0.05	0.056	-	-
HCM Control Delay (s)	8.7	-	13.8	10.2	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	0.2	-	-



Intersection	
Intersection Delay, s/veh	13
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	27	10	21	28	25	80	23	361	6	25	186	12
Future Vol, veh/h	27	10	21	28	25	80	23	361	6	25	186	12
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	11	23	30	27	87	25	392	7	27	202	13
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.5	10.1	15.7	10.9
HCM LOS	A	B	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	21%	100%	0%
Vol Thru, %	0%	98%	17%	19%	0%	94%
Vol Right, %	0%	2%	36%	60%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	23	367	58	133	25	198
LT Vol	23	0	27	28	25	0
Through Vol	0	361	10	25	0	186
RT Vol	0	6	21	80	0	12
Lane Flow Rate	25	399	63	145	27	215
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.041	0.603	0.102	0.22	0.046	0.334
Departure Headway (Hd)	5.957	5.441	5.838	5.47	6.137	5.588
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	605	666	613	656	585	644
Service Time	3.657	3.141	3.881	3.507	3.863	3.314
HCM Lane V/C Ratio	0.041	0.599	0.103	0.221	0.046	0.334
HCM Control Delay	8.9	16.1	9.5	10.1	9.2	11.1
HCM Lane LOS	A	C	A	B	A	B
HCM 95th-tile Q	0.1	4.1	0.3	0.8	0.1	1.5

Intersection						
Int Delay, s/veh	6.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	122	49	133	258	129	48
Future Vol, veh/h	122	49	133	258	129	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	133	53	145	280	140	52

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	145	0	0	464	145
Stage 1	-	-	-	145	-
Stage 2	-	-	-	319	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1437	-	0	556	902
Stage 1	-	-	0	882	-
Stage 2	-	-	0	737	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1437	-	-	504	902
Mov Cap-2 Maneuver	-	-	-	504	-
Stage 1	-	-	-	800	-
Stage 2	-	-	-	737	-

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1437	-	-	504	902
HCM Lane V/C Ratio	0.092	-	-	0.278	0.058
HCM Control Delay (s)	7.8	-	-	14.9	9.2
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	1.1	0.2

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	TT		T	T	T	
Traffic Vol, veh/h	54	15	22	336	141	95
Future Vol, veh/h	54	15	22	336	141	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	16	24	365	153	103

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	618	205	256	0	-	0
Stage 1	205	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	453	836	1309	-	-	-
Stage 1	829	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	445	836	1309	-	-	-
Mov Cap-2 Maneuver	595	-	-	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	668	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1309	-	635	-	-
HCM Lane V/C Ratio	0.018	-	0.118	-	-
HCM Control Delay (s)	7.8	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	49	0	0	61	0	10
Future Vol, veh/h	49	0	0	61	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	0	0	66	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	53	0	119 53
Stage 1	-	-	-	-	53 -
Stage 2	-	-	-	-	66 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1553	-	877 1014
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	957 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1553	-	877 1014
Mov Cap-2 Maneuver	-	-	-	-	877 -
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	957 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1014	-	-	1553	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	242	0	8	72	0	8
Future Vol, veh/h	242	0	8	72	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	263	0	9	78	0	9

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	263	0	359
Stage 1	-	-	-	-	263
Stage 2	-	-	-	-	96
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1301	-	640
Stage 1	-	-	-	-	781
Stage 2	-	-	-	-	928
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1301	-	636
Mov Cap-2 Maneuver	-	-	-	-	668
Stage 1	-	-	-	-	781
Stage 2	-	-	-	-	922

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	776	-	-	1301	-
HCM Lane V/C Ratio	0.011	-	-	0.007	-
HCM Control Delay (s)	9.7	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	176	251	7	149	41	5
Future Volume (veh/h)	176	251	7	149	41	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	191	273	8	162	45	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	613	520	23	1004	112	12
Arrive On Green	0.33	0.33	0.01	0.54	0.07	0.07
Sat Flow, veh/h	1870	1585	1781	1870	1554	173
Grp Volume(v), veh/h	191	273	8	162	51	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1762	0
Q Serve(g_s), s	1.8	3.4	0.1	1.1	0.7	0.0
Cycle Q Clear(g_c), s	1.8	3.4	0.1	1.1	0.7	0.0
Prop In Lane		1.00	1.00		0.88	0.10
Lane Grp Cap(c), veh/h	613	520	23	1004	127	0
V/C Ratio(X)	0.31	0.53	0.35	0.16	0.40	0.00
Avail Cap(c_a), veh/h	2359	1999	541	1970	1122	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.0	6.6	11.8	2.8	10.6	0.0
Incr Delay (d2), s/veh	0.3	0.8	8.6	0.1	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.6	0.1	0.1	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.3	7.4	20.4	2.9	12.7	0.0
LnGrp LOS	A	A	C	A	B	A
Approach Vol, veh/h	464			170	51	
Approach Delay, s/veh	6.9			3.7	12.7	
Approach LOS	A			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		6.4	5.0	12.6		17.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		2.7	2.1	5.4		3.1
Green Ext Time (p_c), s		0.1	0.0	2.1		0.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			6.6			
HCM 6th LOS			A			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	50	113	106	68	32	54
Future Vol, veh/h	50	113	106	68	32	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	123	115	74	35	59
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.7	8.3	8.1
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	31%	0%	100%	0%
Vol Thru, %	69%	61%	0%	0%
Vol Right, %	0%	39%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	163	174	32	54
LT Vol	50	0	32	0
Through Vol	113	106	0	0
RT Vol	0	68	0	54
Lane Flow Rate	177	189	35	59
Geometry Grp	2	2	7	7
Degree of Util (X)	0.218	0.217	0.056	0.075
Departure Headway (Hd)	4.424	4.129	5.835	4.627
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	815	872	615	775
Service Time	2.436	2.14	3.559	2.351
HCM Lane V/C Ratio	0.217	0.217	0.057	0.076
HCM Control Delay	8.7	8.3	8.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.8	0.2	0.2

**Intersection**

Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	172	119	82	73	43
Future Vol, veh/h	28	172	119	82	73	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	187	129	89	79	47
Number of Lanes	1	0	0	1	1	1













Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.8	9.8	8.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	59%	14%	0%	0%
Vol Thru, %	41%	0%	100%	0%
Vol Right, %	0%	86%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	201	200	73	43
LT Vol	119	28	0	0
Through Vol	82	0	73	0
RT Vol	0	172	0	43
Lane Flow Rate	218	217	79	47
Geometry Grp	5	2	7	7
Degree of Util (X)	0.29	0.258	0.115	0.059
Departure Headway (Hd)	4.786	4.267	5.217	4.512
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	749	841	686	792
Service Time	2.823	2.294	2.957	2.251
HCM Lane V/C Ratio	0.291	0.258	0.115	0.059
HCM Control Delay	9.8	8.8	8.6	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.2	1	0.4	0.2



HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 0630 AM  
 Centennial Site

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	79	340	127	209	195
Future Volume (veh/h)	30	79	340	127	209	195
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	33	86	370	138	227	212
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	167	416	545	462	301	1116
Arrive On Green	0.10	0.10	0.30	0.30	0.17	0.61
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	33	86	370	138	227	212
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.6	1.6	6.5	2.5	4.5	1.9
Cycle Q Clear(g_c), s	0.6	1.6	6.5	2.5	4.5	1.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	167	416	545	462	301	1116
V/C Ratio(X)	0.20	0.21	0.68	0.30	0.75	0.19
Avail Cap(c_a), veh/h	671	865	1508	1278	947	2457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	10.3	11.3	9.9	14.4	3.1
Incr Delay (d2), s/veh	0.6	0.2	1.5	0.4	3.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	1.9	0.6	1.6	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.8	10.6	12.8	10.2	18.2	3.2
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	119		508			439
Approach Delay, s/veh	12.0		12.1			11.0
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.4	16.7			28.1	8.4
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.5	8.5			3.9	3.6
Green Ext Time (p_c), s	0.5	2.4			1.1	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.6			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	3.5	14.6	4.4	6.9

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.1	0.0	0.3
Total Del/Veh (s)	3.7	6.2	12.9	7.1

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.4	2.0	1.0
Total Del/Veh (s)	12.7	4.4	8.1	7.2	6.2

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	1.0	2.9	1.0
Total Del/Veh (s)	5.0	9.0	22.4	39.5	18.1

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.6	3.8	20.2	8.4

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.4	1.4	0.0	0.2
Total Del/Veh (s)	5.6	8.7	10.6	0.9	5.2

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.4	2.1	1.3
Total Del/Veh (s)	11.9	12.7	5.9	8.6

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.9	0.0	0.1	0.3
Total Del/Veh (s)	6.2	4.8	6.8	5.5

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	5.6	7.8	0.5	4.1

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative plus Project 0630-0730 AM  
To Centennial  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles													
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph	
South: SR 49 Ramps													
3	L2	13	3.0	0.093	5.0	LOS A	0.4	9.7	0.49	0.39	0.49	34.8	
8	T1	21	3.0	0.093	5.0	LOS A	0.4	9.7	0.49	0.39	0.49	34.7	
18	R2	48	3.0	0.093	5.0	LOS A	0.4	9.7	0.49	0.39	0.49	33.7	
Approach		82	3.0	0.093	5.0	LOS A	0.4	9.7	0.49	0.39	0.49	34.1	
East: Idaho Maryland Rd													
1	L2	149	3.0	0.131	4.3	LOS A	0.5	13.8	0.34	0.22	0.34	32.8	
6	T1	71	3.0	0.165	4.6	LOS A	0.7	17.7	0.35	0.23	0.35	35.3	
16	R2	116	3.0	0.165	4.6	LOS A	0.7	17.7	0.35	0.23	0.35	34.2	
Approach		336	3.0	0.165	4.5	LOS A	0.7	17.7	0.34	0.22	0.34	33.8	
North: Main St													
7	L2	77	3.0	0.215	5.2	LOS A	0.9	22.7	0.37	0.26	0.37	34.3	
4	T1	165	3.0	0.215	5.2	LOS A	0.9	22.7	0.37	0.26	0.37	34.2	
14	R2	78	3.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2	
Approach		319	3.0	0.215	3.9	LOS A	0.9	22.7	0.28	0.19	0.28	34.9	
West: Main St													
5	L2	173	3.0	0.357	7.5	LOS A	1.6	40.9	0.52	0.47	0.52	32.6	
2	T1	152	3.0	0.357	7.5	LOS A	1.6	40.9	0.52	0.47	0.52	32.6	
12	R2	25	3.0	0.357	7.5	LOS A	1.6	40.9	0.52	0.47	0.52	31.7	
Approach		349	3.0	0.357	7.5	LOS A	1.6	40.9	0.52	0.47	0.52	32.6	
All Vehicles		1087	3.0	0.357	5.3	LOS A	1.6	40.9	0.39	0.30	0.39	33.7	

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\31-35 CPP Centennial\7.3.3 CPP Centennial 0630 AM Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	62	378	5	0	0	0	0	104	170	168	360	0
Future Vol, veh/h	62	378	5	0	0	0	0	104	170	168	360	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	411	5	0	0	0	0	113	185	183	391	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	16.2	16.8	20.9
HCM LOS	C	C	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	25%	0%	100%	0%
Vol Thru, %	38%	75%	97%	0%	100%
Vol Right, %	62%	0%	3%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	274	251	194	168	360
LT Vol	0	62	0	168	0
Through Vol	104	189	189	0	360
RT Vol	170	0	5	0	0
Lane Flow Rate	298	273	211	183	391
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.535	0.535	0.405	0.359	0.714
Departure Headway (Hd)	6.465	7.059	6.915	7.078	6.568
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	557	510	519	506	548
Service Time	4.53	4.825	4.68	4.844	4.335
HCM Lane V/C Ratio	0.535	0.535	0.407	0.362	0.714
HCM Control Delay	16.8	17.7	14.3	13.8	24.2
HCM Lane LOS	C	C	B	B	C
HCM 95th-tile Q	3.1	3.1	1.9	1.6	5.8

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project 1530 PM  
Centennial Site



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	342	50	70	681	180	259
Future Volume (veh/h)	342	50	70	681	180	259
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	364	53	74	724	191	276
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	447	65	99	1018	301	756
Arrive On Green	0.28	0.28	0.31	0.31	0.17	0.17
Sat Flow, veh/h	1596	232	322	3403	1781	1585
Grp Volume(v), veh/h	0	417	426	372	191	276
Grp Sat Flow(s),veh/h/ln	0	1829	1854	1777	1781	1585
Q Serve(g_s), s	0.0	12.3	12.0	10.6	5.8	6.4
Cycle Q Clear(g_c), s	0.0	12.3	12.0	10.6	5.8	6.4
Prop In Lane		0.13	0.17		1.00	1.00
Lane Grp Cap(c), veh/h	0	512	570	547	301	756
V/C Ratio(X)	0.00	0.81	0.75	0.68	0.63	0.37
Avail Cap(c_a), veh/h	0	797	808	775	777	1179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	19.5	18.1	17.6	22.4	9.6
Incr Delay (d2), s/veh	0.0	3.7	2.4	1.5	2.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		5.2	4.9	4.1	2.4	3.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	23.2	20.4	19.1	24.6	9.9
LnGrp LOS	A	C	C	B	C	A
Approach Vol, veh/h	417			798	467	
Approach Delay, s/veh	23.2			19.8	15.9	
Approach LOS	C			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		14.5		21.0		22.6
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		8.4		14.3		14.0
Green Ext Time (p_c), s		1.4		1.9		3.9

Intersection Summary

HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project 1530 PM  
Centennial Site



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	500	94	35	649	124	57
Future Volume (veh/h)	500	94	35	649	124	57
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	543	102	38	705	135	62
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	842	158	54	1043	176	81
Arrive On Green	0.28	0.28	0.30	0.30	0.15	0.15
Sat Flow, veh/h	3081	559	178	3554	1169	537
Grp Volume(v), veh/h	322	323	398	345	198	0
Grp Sat Flow(s),veh/h/ln1777	1770	1861	1777	1715	0	
Q Serve(g_s), s	8.4	8.4	10.0	8.9	5.8	0.0
Cycle Q Clear(g_c), s	8.4	8.4	10.0	8.9	5.8	0.0
Prop In Lane		0.32	0.10		0.68	0.31
Lane Grp Cap(c), veh/h	501	499	561	536	258	0
V/C Ratio(X)	0.64	0.65	0.71	0.64	0.77	0.00
Avail Cap(c_a), veh/h	1361	1355	895	854	306	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.6	16.6	16.3	15.9	21.5	0.0
Incr Delay (d2), s/veh	1.4	1.4	1.7	1.3	9.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln3.2		3.2	4.0	3.3	2.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.0	18.0	18.0	17.2	30.8	0.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	645			743	198	
Approach Delay, s/veh	18.0			17.6	30.8	
Approach LOS	B			B	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		12.5		19.5		20.6
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		9.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		7.8		10.4		12.0
Green Ext Time (p_c), s		0.1		4.4		3.9

Intersection Summary

HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project 1530 PM  
 Centennial Site



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↑	↔	↔	↔		↔	↔	
Traffic Volume (veh/h)	3	65	217	32	31	69	191	582	70	137	479	14
Future Volume (veh/h)	3	65	217	32	31	69	191	582	70	137	479	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	69	231	34	33	73	203	619	74	146	510	15
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	241	434	71	69	122	247	671	80	167	1283	38
Arrive On Green	0.13	0.13	0.13	0.08	0.08	0.08	0.14	0.41	0.41	0.09	0.36	0.36
Sat Flow, veh/h	78	1789	1585	926	898	1585	1781	1639	196	1781	3525	104
Grp Volume(v), veh/h	72	0	231	67	0	73	203	0	693	146	257	268
Grp Sat Flow(s),veh/h/ln	1866	0	1585	1824	0	1585	1781	0	1835	1781	1777	1852
Q Serve(g_s), s	2.6	0.0	9.1	2.6	0.0	3.3	8.1	0.0	26.4	5.9	7.9	7.9
Cycle Q Clear(g_c), s	2.6	0.0	9.1	2.6	0.0	3.3	8.1	0.0	26.4	5.9	7.9	7.9
Prop In Lane	0.04		1.00	0.51		1.00	1.00		0.11	1.00		0.06
Lane Grp Cap(c), veh/h	251	0	434	140	0	122	247	0	751	167	647	674
V/C Ratio(X)	0.29	0.00	0.53	0.48	0.00	0.60	0.82	0.00	0.92	0.87	0.40	0.40
Avail Cap(c_a), veh/h	251	0	434	370	0	321	361	0	806	167	647	674
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	22.7	32.5	0.0	32.8	30.8	0.0	20.6	32.9	17.4	17.4
Incr Delay (d2), s/veh	0.6	0.0	1.3	2.5	0.0	4.6	9.4	0.0	15.5	36.4	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	3.4	1.2	0.0	1.4	4.0	0.0	13.5	4.2	3.1	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.3	0.0	24.0	35.0	0.0	37.5	40.1	0.0	36.1	69.3	17.8	17.8
LnGrp LOS	C	A	C	D	A	D	D	A	D	E	B	B
Approach Vol, veh/h		303			140			896			671	
Approach Delay, s/veh		25.2			36.3			37.0			29.0	
Approach LOS		C			D			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	2.0	35.8		15.0	15.3	32.5		10.8				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9	32.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+11), s	9	28.4		11.1	10.1	9.9		5.3				
Green Ext Time (p_c), s	0.0	1.7		0.0	0.2	2.7		0.3				

Intersection Summary

HCM 6th Ctrl Delay	32.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	141	126	57	677	640	70
Future Vol, veh/h	141	126	57	677	640	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	130	59	698	660	72

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1512	366	732	0	-	0
Stage 1	696	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 121	632	870	-	-	-
Stage 1	457	-	-	-	-	-
Stage 2	434	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 113	632	870	-	-	-
Mov Cap-2 Maneuver	308	-	-	-	-	-
Stage 1	426	-	-	-	-	-
Stage 2	434	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.9	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	870	-	308	632	-	-
HCM Lane V/C Ratio	0.068	-	0.472	0.206	-	-
HCM Control Delay (s)	9.4	-	26.7	12.2	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.4	0.8	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	27.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	38	33	10	16	25	77	13	376	23	129	465	62
Future Vol, veh/h	38	33	10	16	25	77	13	376	23	129	465	62
Peak Hour Factor	0.94	0.90	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	37	11	17	27	82	14	400	24	137	495	66
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11.8	11.7	23.2	34.4
HCM LOS	B	B	C	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	14%	100%	0%
Vol Thru, %	0%	94%	41%	21%	0%	88%
Vol Right, %	0%	6%	12%	65%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	399	81	118	129	527
LT Vol	13	0	38	16	129	0
Through Vol	0	376	33	25	0	465
RT Vol	0	23	10	77	0	62
Lane Flow Rate	14	424	88	126	137	561
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.026	0.725	0.176	0.234	0.243	0.902
Departure Headway (Hd)	6.698	6.149	7.225	6.709	6.38	5.789
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	531	582	499	539	560	622
Service Time	4.487	3.937	5.234	4.709	4.158	3.567
HCM Lane V/C Ratio	0.026	0.729	0.176	0.234	0.245	0.902
HCM Control Delay	9.7	23.6	11.8	11.7	11.2	40.1
HCM Lane LOS	A	C	B	B	B	E
HCM 95th-tile Q	0.1	6.1	0.6	0.9	0.9	11.1

Intersection						
Int Delay, s/veh	24.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	91	216	191	285	350	117
Future Vol, veh/h	91	216	191	285	350	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	235	208	310	380	127

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	208	0	-	0	641
Stage 1	-	-	-	-	208
Stage 2	-	-	-	-	433
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1363	-	-	0	439
Stage 1	-	-	-	0	827
Stage 2	-	-	-	0	654
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1363	-	-	-	407
Mov Cap-2 Maneuver	-	-	-	-	407
Stage 1	-	-	-	-	767
Stage 2	-	-	-	-	654

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	48.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1363	-	-	407	832
HCM Lane V/C Ratio	0.073	-	-	0.935	0.153
HCM Control Delay (s)	7.8	-	-	61.9	10.1
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	10.4	0.5

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	9	1	380	482	10
Future Vol, veh/h	32	9	1	380	482	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	10	1	413	524	11

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	945	530	535	0	-	0
Stage 1	530	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	291	549	1033	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	291	549	1033	-	-	-
Mov Cap-2 Maneuver	485	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	666	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1033	-	498	-	-
HCM Lane V/C Ratio	0.001	-	0.089	-	-
HCM Control Delay (s)	8.5	-	12.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	70	0	0	95	0	10
Future Vol, veh/h	70	0	0	95	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	0	0	103	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	76	0	179 76
Stage 1	-	-	-	-	76 -
Stage 2	-	-	-	-	103 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1523	-	811 985
Stage 1	-	-	-	-	947 -
Stage 2	-	-	-	-	921 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1523	-	811 985
Mov Cap-2 Maneuver	-	-	-	-	811 -
Stage 1	-	-	-	-	947 -
Stage 2	-	-	-	-	921 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	985	-	-	1523	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	140	0	8	238	0	8
Future Vol, veh/h	140	0	8	238	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	0	9	259	0	9

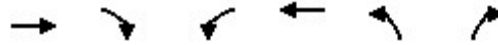
Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	152	0	429
Stage 1	-	-	-	-	152
Stage 2	-	-	-	-	277
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1429	-	583
Stage 1	-	-	-	-	876
Stage 2	-	-	-	-	770
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1429	-	579
Mov Cap-2 Maneuver	-	-	-	-	633
Stage 1	-	-	-	-	876
Stage 2	-	-	-	-	765

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	894	-	-	1429	-
HCM Lane V/C Ratio	0.01	-	-	0.006	-
HCM Control Delay (s)	9.1	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project 1530 PM  
 Centennial Site



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	322	146	13	384	332	37
Future Volume (veh/h)	322	146	13	384	332	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	350	159	14	417	361	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	550	466	39	838	454	50
Arrive On Green	0.29	0.29	0.02	0.45	0.29	0.29
Sat Flow, veh/h	1870	1585	1781	1870	1580	175
Grp Volume(v), veh/h	350	159	14	417	402	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1760	0
Q Serve(g_s), s	5.8	2.8	0.3	5.6	7.5	0.0
Cycle Q Clear(g_c), s	5.8	2.8	0.3	5.6	7.5	0.0
Prop In Lane		1.00	1.00		0.90	0.10
Lane Grp Cap(c), veh/h	550	466	39	838	505	0
V/C Ratio(X)	0.64	0.34	0.36	0.50	0.80	0.00
Avail Cap(c_a), veh/h	1596	1353	366	1333	758	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.9	9.8	17.1	7.0	11.7	0.0
Incr Delay (d2), s/veh	1.2	0.4	5.5	0.5	3.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.8	0.2	1.5	2.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.1	10.3	22.7	7.4	15.2	0.0
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h				431	402	
Approach Delay, s/veh				11.5	15.2	
Approach LOS				B	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		14.9	5.5	15.1		20.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		9.5	2.3	7.8		7.6
Green Ext Time (p_c), s		0.7	0.0	2.7		2.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.5			
HCM 6th LOS			B			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	244	114	182	95	158	230
Future Vol, veh/h	244	114	182	95	158	230
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	265	124	198	103	172	250
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	17.5	13.2	12.6
HCM LOS	C	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	68%	0%	100%	0%
Vol Thru, %	32%	66%	0%	0%
Vol Right, %	0%	34%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	358	277	158	230
LT Vol	244	0	158	0
Through Vol	114	182	0	0
RT Vol	0	95	0	230
Lane Flow Rate	389	301	172	250
Geometry Grp	2	2	7	7
Degree of Util (X)	0.616	0.461	0.33	0.396
Departure Headway (Hd)	5.696	5.515	6.916	5.696
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	634	650	520	630
Service Time	3.741	3.564	4.662	3.442
HCM Lane V/C Ratio	0.614	0.463	0.331	0.397
HCM Control Delay	17.5	13.2	13.1	12.2
HCM Lane LOS	C	B	B	B
HCM 95th-tile Q	4.2	2.4	1.4	1.9

**Intersection**

Intersection Delay, s/veh 14.3  
Intersection LOS F













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	RT			LT	LT	RT
Traffic Vol, veh/h	133	441	426	418	379	139
Future Vol, veh/h	133	441	426	418	379	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	479	463	454	412	151
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	108.4	393.1	40.5
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	50%	23%	0%	0%
Vol Thru, %	50%	0%	100%	0%
Vol Right, %	0%	77%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	844	574	379	139
LT Vol	426	133	0	0
Through Vol	418	0	379	0
RT Vol	0	441	0	139
Lane Flow Rate	917	624	412	151
Geometry Grp	5	2	7	7
Degree of Util (X)	1.814	1.128	0.872	0.291
Departure Headway (Hd)	7.589	7.712	9.241	8.508
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	486	474	395	426
Service Time	5.589	5.712	6.941	6.208
HCM Lane V/C Ratio	1.887	1.316	1.043	0.354
HCM Control Delay	393.1	108.4	49.9	14.7
HCM Lane LOS	F	F	E	B
HCM 95th-tile Q	54.2	18.3	8.6	1.2

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 1530 PM  
 Centennial Site

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	183	349	412	78	182	460
Future Volume (veh/h)	183	349	412	78	182	460
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	199	379	448	85	198	500
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	424	604	566	480	255	1010
Arrive On Green	0.24	0.24	0.31	0.31	0.15	0.55
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	199	379	448	85	198	500
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	5.2	10.4	11.8	2.1	5.8	8.9
Cycle Q Clear(g_c), s	5.2	10.4	11.8	2.1	5.8	8.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	424	604	566	480	255	1010
V/C Ratio(X)	0.47	0.63	0.79	0.18	0.78	0.49
Avail Cap(c_a), veh/h	465	641	1046	887	657	1704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	13.0	16.6	13.3	21.7	7.2
Incr Delay (d2), s/veh	0.8	1.8	2.5	0.2	5.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	3.3	4.3	0.6	2.3	2.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.8	14.8	19.2	13.4	26.7	7.6
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	578		533			698
Approach Delay, s/veh	15.8		18.2			13.0
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.8	22.1			35.0	17.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	7.8	13.8			10.9	12.4
Green Ext Time (p_c), s	0.4	2.5			3.1	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			15.5			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	11.5	14.6	5.7	9.0

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.0	0.9	0.6
Total Del/Veh (s)	5.1	8.1	15.9	9.5

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.7	2.1	1.1
Total Del/Veh (s)	20.5	10.2	17.3	16.7	14.2

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.8	0.5
Total Del/Veh (s)	12.7	13.4	16.8	34.5	17.2

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	10.3	10.6	28.4	14.8

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.6	0.0	0.6
Total Del/Veh (s)	20.2	40.6	44.6	13.7	30.2

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.8	2.7	1.0
Total Del/Veh (s)	13.9	13.9	18.2	15.0

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	0.0	0.2	0.7
Total Del/Veh (s)	19.3	13.4	20.3	16.9

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.4	0.3
Total Del/Veh (s)	11.6	9.6	1.8	7.6

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Centennial plus Project 1530-1630 PM  
 To Centennial  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	57	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	33.3
8	T1	63	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	33.2
18	R2	106	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	32.3
Approach		226	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	32.8
East: Idaho Maryland Rd												
1	L2	382	3.0	0.379	7.6	LOS A	1.9	47.8	0.53	0.45	0.53	31.4
6	T1	266	3.0	0.465	8.9	LOS A	2.6	67.5	0.58	0.51	0.60	33.1
16	R2	206	3.0	0.465	8.9	LOS A	2.6	67.5	0.58	0.51	0.60	32.1
Approach		854	3.0	0.465	8.3	LOS A	2.6	67.5	0.56	0.48	0.57	32.1
North: Main St												
7	L2	115	3.0	0.483	11.7	LOS B	2.8	71.6	0.69	0.80	1.02	31.2
4	T1	245	3.0	0.483	11.7	LOS B	2.8	71.6	0.69	0.80	1.02	31.2
14	R2	333	3.0	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		693	3.0	0.483	6.1	LOS A	2.8	71.6	0.36	0.41	0.53	33.8
West: Main St												
5	L2	215	3.0	0.539	13.4	LOS B	3.4	87.8	0.72	0.87	1.17	30.0
2	T1	135	3.0	0.539	13.4	LOS B	3.4	87.8	0.72	0.87	1.17	29.9
12	R2	39	3.0	0.539	13.4	LOS B	3.4	87.8	0.72	0.87	1.17	29.2
Approach		389	3.0	0.539	13.4	LOS B	3.4	87.8	0.72	0.87	1.17	29.9
All Vehicles		2161	3.0	0.539	8.4	LOS A	3.4	87.8	0.53	0.54	0.67	32.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Thursday, January 2, 2020 4:19:52 PM

Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\31-35 CPP Centennial\7.4.3 CPP Centennial 1530 PM Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	37	208	6	0	0	0	0	67	66	118	237	0
Future Vol, veh/h	37	208	6	0	0	0	0	67	66	118	237	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	226	7	0	0	0	0	73	72	128	258	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

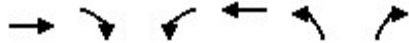
Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.4	10.1	11.3
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	26%	0%	100%	0%
Vol Thru, %	50%	74%	95%	0%	100%
Vol Right, %	50%	0%	5%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	133	141	110	118	237
LT Vol	0	37	0	118	0
Through Vol	67	104	104	0	237
RT Vol	66	0	6	0	0
Lane Flow Rate	145	153	120	128	258
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.219	0.255	0.193	0.212	0.39
Departure Headway (Hd)	5.454	5.99	5.819	5.956	5.452
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	652	595	611	599	654
Service Time	3.544	3.779	3.608	3.735	3.231
HCM Lane V/C Ratio	0.222	0.257	0.196	0.214	0.394
HCM Control Delay	10.1	10.8	10	10.4	11.7
HCM Lane LOS	B	B	A	B	B
HCM 95th-tile Q	0.8	1	0.7	0.8	1.8



HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	135	28	23	310	73	128
Future Volume (veh/h)	135	28	23	310	73	128
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	30	25	337	79	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	280	57	52	743	354	662
Arrive On Green	0.19	0.19	0.22	0.22	0.20	0.20
Sat Flow, veh/h	1507	308	240	3489	1781	1585
Grp Volume(v), veh/h	0	177	194	168	79	139
Grp Sat Flow(s),veh/h/ln	0	1815	1858	1777	1781	1585
Q Serve(g_s), s	0.0	3.1	3.2	2.9	1.3	2.0
Cycle Q Clear(g_c), s	0.0	3.1	3.2	2.9	1.3	2.0
Prop In Lane		0.17	0.13		1.00	1.00
Lane Grp Cap(c), veh/h	0	337	406	389	354	662
V/C Ratio(X)	0.00	0.52	0.48	0.43	0.22	0.21
Avail Cap(c_a), veh/h	0	1292	1322	1264	1268	1475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	13.1	12.1	12.0	11.9	6.6
Incr Delay (d2), s/veh	0.0	1.3	0.9	0.8	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		1.1	1.1	1.0	0.4	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	14.3	13.0	12.7	12.3	6.8
LnGrp LOS	A	B	B	B	B	A
Approach Vol, veh/h	177			362	218	
Approach Delay, s/veh	14.3			12.9	8.8	
Approach LOS	B			B	A	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		11.8		11.3		12.5
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		4.0		5.1		5.2
Green Ext Time (p_c), s		0.6		0.9		2.0

Intersection Summary

HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	246	9	2	291	31	16
Future Volume (veh/h)	246	9	2	291	31	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	267	10	2	316	34	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	743	28	5	789	192	96
Arrive On Green	0.21	0.21	0.22	0.22	0.17	0.17
Sat Flow, veh/h	3587	130	22	3718	1120	560
Grp Volume(v), veh/h	135	142	171	147	52	0
Grp Sat Flow(s),veh/h/ln	1777	1847	1869	1777	1714	0
Q Serve(g_s), s	2.3	2.3	2.8	2.5	0.9	0.0
Cycle Q Clear(g_c), s	2.3	2.3	2.8	2.5	0.9	0.0
Prop In Lane		0.07	0.01		0.65	0.33
Lane Grp Cap(c), veh/h	378	393	407	387	293	0
V/C Ratio(X)	0.36	0.36	0.42	0.38	0.18	0.00
Avail Cap(c_a), veh/h	2040	2120	1347	1281	459	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.8	11.8	11.8	11.7	12.4	0.0
Incr Delay (d2), s/veh	0.6	0.6	0.7	0.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.8	1.0	0.8	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.4	12.3	12.5	12.3	12.7	0.0
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	277			318	52	
Approach Delay, s/veh	12.3			12.4	12.7	
Approach LOS	B			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		10.6		12.2		12.3
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		9.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		2.9		4.3		4.8
Green Ext Time (p_c), s		0.0		1.7		1.7

Intersection Summary

HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
 03/02/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↖		↖	↕	↖
Traffic Volume (veh/h)	1	34	147	26	16	50	92	247	36	100	305	1
Future Volume (veh/h)	1	34	147	26	16	50	92	247	36	100	305	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	37	160	28	17	54	100	268	39	109	332	1
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	228	349	106	64	149	168	380	55	146	820	2
Arrive On Green	0.13	0.13	0.13	0.09	0.09	0.09	0.09	0.24	0.24	0.08	0.23	0.23
Sat Flow, veh/h	49	1819	1585	1129	685	1585	1781	1596	232	1781	3634	11
Grp Volume(v), veh/h	38	0	160	45	0	54	100	0	307	109	162	171
Grp Sat Flow(s),veh/h/ln	1868	0	1585	1814	0	1585	1781	0	1829	1781	1777	1868
Q Serve(g_s), s	0.8	0.0	4.0	1.1	0.0	1.5	2.5	0.0	7.0	2.7	3.6	3.6
Cycle Q Clear(g_c), s	0.8	0.0	4.0	1.1	0.0	1.5	2.5	0.0	7.0	2.7	3.6	3.6
Prop In Lane	0.03		1.00	0.62		1.00	1.00		0.13	1.00		0.01
Lane Grp Cap(c), veh/h	234	0	349	171	0	149	168	0	435	146	401	421
V/C Ratio(X)	0.16	0.00	0.46	0.26	0.00	0.36	0.59	0.00	0.71	0.75	0.40	0.41
Avail Cap(c_a), veh/h	405	0	494	593	0	518	582	0	1295	269	947	995
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	15.4	19.2	0.0	19.4	19.8	0.0	15.9	20.5	15.1	15.1
Incr Delay (d2), s/veh	0.3	0.0	0.9	0.8	0.0	1.5	3.3	0.0	2.1	7.3	0.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.3	0.4	0.0	0.5	1.1	0.0	2.8	1.3	1.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.0	16.4	20.0	0.0	20.9	23.1	0.0	18.0	27.8	15.7	15.7
LnGrp LOS	B	A	B	C	A	C	C	A	B	C	B	B
Approach Vol, veh/h		198			99			407			442	
Approach Delay, s/veh		16.7			20.5			19.3			18.7	
Approach LOS		B			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	16.6		10.8	9.4	16.0		9.4				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	32.3	32.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+14), s	9.0	9.0		6.0	4.5	5.6		3.5				
Green Ext Time (p_c), s	0.0	1.8		0.2	0.1	1.8		0.2				

Intersection Summary

HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	34	65	18	312	448	28
Future Vol, veh/h	34	65	18	312	448	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	71	20	339	487	30

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	881	259	517	0	-	0
Stage 1	502	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	301	741	1047	-	-	-
Stage 1	574	-	-	-	-	-
Stage 2	691	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	295	741	1047	-	-	-
Mov Cap-2 Maneuver	480	-	-	-	-	-
Stage 1	563	-	-	-	-	-
Stage 2	691	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1047	-	480	741	-	-
HCM Lane V/C Ratio	0.019	-	0.077	0.095	-	-
HCM Control Delay (s)	8.5	-	13.1	10.4	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	0.3	-	-

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	24	25	10	11	15	40	11	228	11	90	343	41
Future Vol, veh/h	24	25	10	11	15	40	11	228	11	90	343	41
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	27	11	12	16	43	12	248	12	98	373	45
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.6	9.3	11.5	14
HCM LOS	A	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	41%	17%	100%	0%
Vol Thru, %	0%	95%	42%	23%	0%	89%
Vol Right, %	0%	5%	17%	61%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	239	59	66	90	384
LT Vol	11	0	24	11	90	0
Through Vol	0	228	25	15	0	343
RT Vol	0	11	10	40	0	41
Lane Flow Rate	12	260	64	72	98	417
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.02	0.388	0.106	0.112	0.154	0.59
Departure Headway (Hd)	5.912	5.375	5.94	5.616	5.666	5.087
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	600	662	607	642	628	701
Service Time	3.704	3.167	3.943	3.619	3.446	2.867
HCM Lane V/C Ratio	0.02	0.393	0.105	0.112	0.156	0.595
HCM Control Delay	8.8	11.6	9.6	9.3	9.5	15
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0.1	1.8	0.4	0.4	0.5	3.9

Intersection						
Int Delay, s/veh	7.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↗		↙	↗
Traffic Vol, veh/h	29	141	81	175	248	50
Future Vol, veh/h	29	141	81	175	248	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	153	88	190	270	54

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	88	0	-	0	305 88
Stage 1	-	-	-	-	88 -
Stage 2	-	-	-	-	217 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1508	-	-	0	687 970
Stage 1	-	-	-	0	935 -
Stage 2	-	-	-	0	819 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1508	-	-	-	673 970
Mov Cap-2 Maneuver	-	-	-	-	673 -
Stage 1	-	-	-	-	915 -
Stage 2	-	-	-	-	819 -

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1508	-	-	673	970
HCM Lane V/C Ratio	0.021	-	-	0.401	0.056
HCM Control Delay (s)	7.4	-	-	13.9	8.9
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.9	0.2

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	14	14	334	300	64
Future Vol, veh/h	54	14	14	334	300	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	15	15	363	326	70

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	754	361	396	0	-	0
Stage 1	361	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	377	684	1163	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	372	684	1163	-	-	-
Mov Cap-2 Maneuver	554	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1163	-	577	-	-
HCM Lane V/C Ratio	0.013	-	0.128	-	-
HCM Control Delay (s)	8.1	-	12.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	0	0	63	0	10
Future Vol, veh/h	48	0	0	63	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	0	0	68	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	52	0	120 52
Stage 1	-	-	-	-	52 -
Stage 2	-	-	-	-	68 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1554	-	876 1016
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	955 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1554	-	876 1016
Mov Cap-2 Maneuver	-	-	-	-	876 -
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	955 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1016	-	-	1554	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-



Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	72	0	8	75	0	8
Future Vol, veh/h	72	0	8	75	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	78	0	9	82	0	9

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	78	0	178
Stage 1	-	-	-	-	78
Stage 2	-	-	-	-	100
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1520	-	812
Stage 1	-	-	-	-	945
Stage 2	-	-	-	-	924
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1520	-	807
Mov Cap-2 Maneuver	-	-	-	-	793
Stage 1	-	-	-	-	945
Stage 2	-	-	-	-	918

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	983	-	-	1520	-
HCM Lane V/C Ratio	0.009	-	-	0.006	-
HCM Control Delay (s)	8.7	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
 03/02/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	131	41	3	116	47	12
Future Volume (veh/h)	131	41	3	116	47	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	142	45	3	126	51	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	494	419	9	823	298	76
Arrive On Green	0.26	0.26	0.00	0.44	0.22	0.22
Sat Flow, veh/h	1870	1585	1781	1870	1365	348
Grp Volume(v), veh/h	142	45	3	126	65	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1739	0
Q Serve(g_s), s	1.7	0.6	0.0	1.1	0.8	0.0
Cycle Q Clear(g_c), s	1.7	0.6	0.0	1.1	0.8	0.0
Prop In Lane		1.00	1.00		0.78	0.20
Lane Grp Cap(c), veh/h	494	419	9	823	379	0
V/C Ratio(X)	0.29	0.11	0.34	0.15	0.17	0.00
Avail Cap(c_a), veh/h	2061	1746	473	1720	968	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.1	7.7	13.6	4.6	8.7	0.0
Incr Delay (d2), s/veh	0.3	0.1	21.3	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.1	0.1	0.2	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.4	7.8	34.9	4.7	8.9	0.0
LnGrp LOS	A	A	C	A	A	A
Approach Vol, veh/h	187			129	65	
Approach Delay, s/veh	8.2			5.4	8.9	
Approach LOS	A			A	A	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		10.7	4.8	12.0		16.8
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		2.8	2.0	3.7		3.1
Green Ext Time (p_c), s		0.1	0.0	0.9		0.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			7.4			
HCM 6th LOS			A			
<b>Notes</b>						
User approved pedestrian interval to be less than phase max green.						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	81	63	48	32	40	74
Future Vol, veh/h	81	63	48	32	40	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	68	52	35	43	80
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.5	7.6	8
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	56%	0%	100%	0%
Vol Thru, %	44%	60%	0%	0%
Vol Right, %	0%	40%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	144	80	40	74
LT Vol	81	0	40	0
Through Vol	63	48	0	0
RT Vol	0	32	0	74
Lane Flow Rate	157	87	43	80
Geometry Grp	2	2	7	7
Degree of Util (X)	0.193	0.101	0.067	0.098
Departure Headway (Hd)	4.436	4.164	5.583	4.378
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	812	863	643	820
Service Time	2.447	2.176	3.3	2.095
HCM Lane V/C Ratio	0.193	0.101	0.067	0.098
HCM Control Delay	8.5	7.6	8.7	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.2	0.3

**Intersection**

Intersection Delay, s/veh 10.5  
Intersection LOS B













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	81	158	153	120	50
Future Vol, veh/h	82	81	158	153	120	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	88	172	166	130	54
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.6	11.8	8.8
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	51%	50%	0%	0%
Vol Thru, %	49%	0%	100%	0%
Vol Right, %	0%	50%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	311	163	120	50
LT Vol	158	82	0	0
Through Vol	153	0	120	0
RT Vol	0	81	0	50
Lane Flow Rate	338	177	130	54
Geometry Grp	5	2	7	7
Degree of Util (X)	0.451	0.244	0.191	0.069
Departure Headway (Hd)	4.803	4.957	5.285	4.579
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	747	721	676	778
Service Time	2.851	3.01	3.041	2.335
HCM Lane V/C Ratio	0.452	0.245	0.192	0.069
HCM Control Delay	11.8	9.6	9.3	7.7
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2.4	1	0.7	0.2

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 1830 PM  
 Centennial Site

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	25	268	24	112	428
Future Volume (veh/h)	43	25	268	24	112	428
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	47	27	291	26	122	465
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	134	286	500	423	187	1015
Arrive On Green	0.08	0.08	0.27	0.27	0.11	0.56
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	47	27	291	26	122	465
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.7	0.4	4.0	0.4	2.0	4.4
Cycle Q Clear(g_c), s	0.7	0.4	4.0	0.4	2.0	4.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	134	286	500	423	187	1015
V/C Ratio(X)	0.35	0.09	0.58	0.06	0.65	0.46
Avail Cap(c_a), veh/h	840	914	1890	1601	1186	3078
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	9.9	9.2	7.8	12.5	3.9
Incr Delay (d2), s/veh	1.5	0.1	1.1	0.1	3.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.1	0.9	0.1	0.7	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.3	10.0	10.2	7.9	16.3	4.2
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	74		317			587
Approach Delay, s/veh	12.7		10.0			6.7
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.2	13.8			22.0	7.2
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	4.0	6.0			6.4	2.7
Green Ext Time (p_c), s	0.2	1.6			2.9	0.1
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.2			
HCM 6th LOS			A			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	12.5	21.5	5.8	12.2

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.9	0.0	0.2
Total Del/Veh (s)	4.7	7.6	18.8	9.1

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.1
Total Del/Veh (s)	17.5	7.2	11.0	10.9	9.7

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.4	2.8	0.7
Total Del/Veh (s)	8.5	13.1	13.5	36.8	16.4

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.3	4.4	23.3	8.7

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.7	1.5	0.0	0.5
Total Del/Veh (s)	9.8	16.5	13.9	3.5	10.5

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.7	3.0	1.4
Total Del/Veh (s)	10.8	11.1	5.7	8.9

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.0	0.0	0.1	0.3
Total Del/Veh (s)	7.9	8.6	8.5	8.4

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.2
Total Del/Veh (s)	6.7	8.0	1.1	4.5



# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative plus Project 1830-1930 PM  
To Centennial  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	38	3.0	0.107	4.9	LOS A	0.4	11.4	0.47	0.36	0.47	34.2
8	T1	43	3.0	0.107	4.9	LOS A	0.4	11.4	0.47	0.36	0.47	34.1
18	R2	18	3.0	0.107	4.9	LOS A	0.4	11.4	0.47	0.36	0.47	33.2
Approach		99	3.0	0.107	4.9	LOS A	0.4	11.4	0.47	0.36	0.47	34.0
East: Idaho Maryland Rd												
1	L2	190	3.0	0.176	4.9	LOS A	0.7	18.9	0.39	0.28	0.39	32.5
6	T1	207	3.0	0.275	6.0	LOS A	1.3	32.5	0.43	0.32	0.43	34.7
16	R2	92	3.0	0.275	6.0	LOS A	1.3	32.5	0.43	0.32	0.43	33.6
Approach		489	3.0	0.275	5.5	LOS A	1.3	32.5	0.41	0.30	0.41	33.6
North: Main St												
7	L2	65	3.0	0.245	6.3	LOS A	1.0	25.2	0.50	0.44	0.50	33.8
4	T1	165	3.0	0.245	6.3	LOS A	1.0	25.2	0.50	0.44	0.50	33.7
14	R2	225	3.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		456	3.0	0.245	3.2	LOS A	1.0	25.2	0.25	0.22	0.25	35.3
West: Main St												
5	L2	176	3.0	0.326	7.2	LOS A	1.4	36.0	0.52	0.47	0.52	32.6
2	T1	112	3.0	0.326	7.2	LOS A	1.4	36.0	0.52	0.47	0.52	32.5
12	R2	23	3.0	0.326	7.2	LOS A	1.4	36.0	0.52	0.47	0.52	31.6
Approach		311	3.0	0.326	7.2	LOS A	1.4	36.0	0.52	0.47	0.52	32.5
All Vehicles		1355	3.0	0.326	5.1	LOS A	1.4	36.0	0.39	0.32	0.39	33.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Thursday, January 2, 2020 4:22:17 PM

Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\31-35 CPP Centennial\7.5.3 CPP 1830 PM Idaho Main.sip8



Intersection	
Intersection Delay, s/veh	33.8
Intersection LOS	D

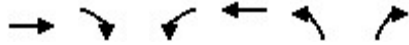
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	76	348	8	0	0	0	0	212	302	166	253	0
Future Vol, veh/h	76	348	8	0	0	0	0	212	302	166	253	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	83	378	9	0	0	0	0	230	328	180	275	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	17.7	61.4	16.6
HCM LOS	C	F	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	30%	0%	100%	0%
Vol Thru, %	41%	70%	96%	0%	100%
Vol Right, %	59%	0%	4%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	514	250	182	166	253
LT Vol	0	76	0	166	0
Through Vol	212	174	174	0	253
RT Vol	302	0	8	0	0
Lane Flow Rate	559	272	198	180	275
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.992	0.566	0.402	0.378	0.536
Departure Headway (Hd)	6.39	7.499	7.312	7.535	7.022
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	564	478	489	475	509
Service Time	4.467	5.286	5.099	5.335	4.822
HCM Lane V/C Ratio	0.991	0.569	0.405	0.379	0.54
HCM Control Delay	61.4	19.7	15	14.9	17.7
HCM Lane LOS	F	C	B	B	C
HCM 95th-tile Q	14.1	3.5	1.9	1.7	3.1

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project AM Peak  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	331	42	58	401	255	546
Future Volume (veh/h)	331	42	58	401	255	546
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	356	45	62	431	274	587
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	425	54	87	638	587	839
Arrive On Green	0.26	0.26	0.20	0.20	0.33	0.33
Sat Flow, veh/h	1628	206	435	3284	1781	1585
Grp Volume(v), veh/h	0	401	263	230	274	587
Grp Sat Flow(s),veh/h/ln	0	1833	1849	1777	1781	1585
Q Serve(g_s), s	0.0	13.9	9.0	8.0	8.2	18.6
Cycle Q Clear(g_c), s	0.0	13.9	9.0	8.0	8.2	18.6
Prop In Lane		0.11	0.24		1.00	1.00
Lane Grp Cap(c), veh/h	0	479	370	355	587	839
V/C Ratio(X)	0.00	0.84	0.71	0.65	0.47	0.70
Avail Cap(c_a), veh/h	0	689	694	667	669	912
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	23.5	25.1	24.8	17.9	11.8
Incr Delay (d2), s/veh	0.0	6.1	2.6	2.0	0.6	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0	0.0	6.4	4.0	3.4	3.2	9.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	29.7	27.7	26.7	18.5	14.0
LnGrp LOS	A	C	C	C	B	B
Approach Vol, veh/h	401			493	861	
Approach Delay, s/veh	29.7			27.2	15.4	
Approach LOS	C			C	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		26.9		22.3		18.2
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+I1), s		20.6		15.9		11.0
Green Ext Time (p_c), s		1.5		1.7		2.5

Intersection Summary

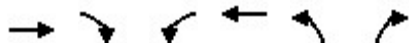
HCM 6th Ctrl Delay	22.0
HCM 6th LOS	C

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project AM Peak  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	724	139	26	392	84	30
Future Volume (veh/h)	724	139	26	392	84	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	762	146	27	413	88	32
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	1172	224	44	711	127	46
Arrive On Green	0.39	0.39	0.21	0.21	0.10	0.10
Sat Flow, veh/h	3068	570	213	3517	1255	456
Grp Volume(v), veh/h	455	453	236	204	121	0
Grp Sat Flow(s),veh/h/ln	1777	1768	1860	1777	1725	0
Q Serve(g_s), s	9.8	9.8	5.4	4.9	3.2	0.0
Cycle Q Clear(g_c), s	9.8	9.8	5.4	4.9	3.2	0.0
Prop In Lane		0.32	0.11		0.73	0.26
Lane Grp Cap(c), veh/h	700	696	387	369	175	0
V/C Ratio(X)	0.65	0.65	0.61	0.55	0.69	0.00
Avail Cap(c_a), veh/h	1519	1512	998	954	381	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.6	11.6	16.9	16.7	20.5	0.0
Incr Delay (d2), s/veh	1.0	1.0	1.6	1.3	4.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	3.3	2.2	1.9	1.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.7	12.7	18.5	18.0	25.3	0.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	908			440	121	
Approach Delay, s/veh	12.7			18.3	25.3	
Approach LOS	B			B	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		9.4		23.3		14.5
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		10.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		5.2		11.8		7.4
Green Ext Time (p_c), s		0.1		6.7		2.4

Intersection Summary

HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project AM Peak  
 To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↖		↖	↕	↗
Traffic Volume (veh/h)	0	9	195	100	95	173	262	504	20	45	460	13
Future Volume (veh/h)	0	9	195	100	95	173	262	504	20	45	460	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	10	207	106	101	184	279	536	21	48	489	14
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	247	502	145	138	246	329	617	24	79	723	21
Arrive On Green	0.00	0.13	0.13	0.16	0.16	0.16	0.18	0.35	0.35	0.04	0.20	0.20
Sat Flow, veh/h	0	1870	1585	934	890	1585	1781	1788	70	1781	3528	101
Grp Volume(v), veh/h	0	10	207	207	0	184	279	0	557	48	246	257
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1824	0	1585	1781	0	1858	1781	1777	1852
Q Serve(g_s), s	0.0	0.3	6.7	7.0	0.0	7.2	9.8	0.0	18.2	1.7	8.3	8.3
Cycle Q Clear(g_c), s	0.0	0.3	6.7	7.0	0.0	7.2	9.8	0.0	18.2	1.7	8.3	8.3
Prop In Lane	0.00		1.00	0.51		1.00	1.00		0.04	1.00		0.05
Lane Grp Cap(c), veh/h	0	247	502	283	0	246	329	0	641	79	364	380
V/C Ratio(X)	0.00	0.04	0.41	0.73	0.00	0.75	0.85	0.00	0.87	0.60	0.68	0.68
Avail Cap(c_a), veh/h	0	285	534	418	0	363	408	0	837	189	664	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	24.6	17.4	26.2	0.0	26.2	25.6	0.0	19.9	30.5	23.8	23.9
Incr Delay (d2), s/veh	0.0	0.1	0.5	3.6	0.0	4.7	12.9	0.0	7.8	7.2	2.2	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	2.3	3.1	0.0	2.8	4.9	0.0	7.9	0.8	3.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	24.7	18.0	29.8	0.0	31.0	38.5	0.0	27.7	37.7	26.0	26.0
LnGrp LOS	A	C	B	C	A	C	D	A	C	D	C	C
Approach Vol, veh/h		217			391			836			551	
Approach Delay, s/veh		18.3			30.3			31.3			27.0	
Approach LOS		B			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	28.1		13.7	17.1	19.0		15.2				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9.9	29.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+1/3), s	13.7	20.2		8.7	11.8	10.3		9.2				
Green Ext Time (p_c), s	0.0	2.2		0.1	0.2	2.2		0.9				

Intersection Summary

HCM 6th Ctrl Delay	28.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	33	47	105	756	543	195
Future Vol, veh/h	33	47	105	756	543	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	51	114	822	590	212

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1746	401	802	0	-	0
Stage 1	696	-	-	-	-	-
Stage 2	1050	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	86	600	819	-	-	-
Stage 1	457	-	-	-	-	-
Stage 2	336	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	74	600	819	-	-	-
Mov Cap-2 Maneuver	252	-	-	-	-	-
Stage 1	393	-	-	-	-	-
Stage 2	336	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	1.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	819	-	252	600	-	-
HCM Lane V/C Ratio	0.139	-	0.142	0.085	-	-
HCM Control Delay (s)	10.1	-	21.6	11.6	-	-
HCM Lane LOS	B	-	C	B	-	-
HCM 95th %tile Q(veh)	0.5	-	0.5	0.3	-	-

Intersection	
Intersection Delay, s/veh	55.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	58	22	25	25	48	181	27	560	12	52	286	29
Future Vol, veh/h	58	22	25	25	48	181	27	560	12	52	286	29
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	24	27	27	52	195	29	602	13	56	308	31
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	13.6	17.1	99.8	20.2
HCM LOS	B	C	F	C

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	55%	10%	100%	0%
Vol Thru, %	0%	98%	21%	19%	0%	91%
Vol Right, %	0%	2%	24%	71%	0%	9%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	27	572	105	254	52	315
LT Vol	27	0	58	25	52	0
Through Vol	0	560	22	48	0	286
RT Vol	0	12	25	181	0	29
Lane Flow Rate	29	615	113	273	56	339
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.058	1.13	0.239	0.507	0.115	0.641
Departure Headway (Hd)	7.141	6.615	8.094	7.067	7.725	7.144
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	498	547	446	513	467	508
Service Time	4.939	4.412	6.094	5.067	5.425	4.844
HCM Lane V/C Ratio	0.058	1.124	0.253	0.532	0.12	0.667
HCM Control Delay	10.4	104	13.6	17.1	11.4	21.7
HCM Lane LOS	B	F	B	C	B	C
HCM 95th-tile Q	0.2	20.1	0.9	2.8	0.4	4.5



Intersection						
Int Delay, s/veh	7.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	↘
Traffic Vol, veh/h	125	151	275	423	158	109
Future Vol, veh/h	125	151	275	423	158	109
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	133	161	293	450	168	116

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	293	0	-	0	720 293
Stage 1	-	-	-	-	293 -
Stage 2	-	-	-	-	427 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1269	-	-	0	395 746
Stage 1	-	-	-	0	757 -
Stage 2	-	-	-	0	658 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1269	-	-	-	354 746
Mov Cap-2 Maneuver	-	-	-	-	354 -
Stage 1	-	-	-	-	678 -
Stage 2	-	-	-	-	658 -

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	18.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1269	-	-	354	746
HCM Lane V/C Ratio	0.105	-	-	0.475	0.155
HCM Control Delay (s)	8.2	-	-	24	10.7
HCM Lane LOS	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	-	-	2.5	0.5

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	15	22	545	241	95
Future Vol, veh/h	54	15	22	545	241	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	16	23	568	251	99

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	915	301	350	0	-	0
Stage 1	301	-	-	-	-	-
Stage 2	614	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	303	739	1209	-	-	-
Stage 1	751	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	297	739	1209	-	-	-
Mov Cap-2 Maneuver	475	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1209	-	515	-	-
HCM Lane V/C Ratio	0.019	-	0.14	-	-
HCM Control Delay (s)	8	-	13.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	95	0	0	105	0	10
Future Vol, veh/h	95	0	0	105	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	0	0	114	0	11

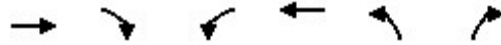
Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	103	0	217
Stage 1	-	-	-	-	103
Stage 2	-	-	-	-	114
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1489	-	771
Stage 1	-	-	-	-	921
Stage 2	-	-	-	-	911
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1489	-	771
Mov Cap-2 Maneuver	-	-	-	-	771
Stage 1	-	-	-	-	921
Stage 2	-	-	-	-	911

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	952	-	-	1489	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.8	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project AM Peak  
 To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	242	343	23	250	79	12
Future Volume (veh/h)	242	343	23	250	79	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	249	354	24	258	81	12
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	662	561	65	1041	167	25
Arrive On Green	0.35	0.35	0.04	0.56	0.11	0.11
Sat Flow, veh/h	1870	1585	1781	1870	1512	224
Grp Volume(v), veh/h	249	354	24	258	94	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1754	0
Q Serve(g_s), s	2.8	5.3	0.4	2.0	1.4	0.0
Cycle Q Clear(g_c), s	2.8	5.3	0.4	2.0	1.4	0.0
Prop In Lane		1.00	1.00		0.86	0.13
Lane Grp Cap(c), veh/h	662	561	65	1041	194	0
V/C Ratio(X)	0.38	0.63	0.37	0.25	0.48	0.00
Avail Cap(c_a), veh/h	2005	1699	460	1674	949	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.8	7.6	13.3	3.2	11.8	0.0
Incr Delay (d2), s/veh	0.4	1.2	3.5	0.1	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.2	0.2	0.2	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.2	8.8	16.8	3.3	13.7	0.0
LnGrp LOS	A	A	B	A	B	A
Approach Vol, veh/h	603			282	94	
Approach Delay, s/veh	8.1			4.5	13.7	
Approach LOS	A			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		7.8	5.7	14.7		20.4
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		3.4	2.4	7.3		4.0
Green Ext Time (p_c), s		0.2	0.0	2.8		1.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			7.6			
HCM 6th LOS			A			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	117	128	156	138	50	121
Future Vol, veh/h	117	128	156	138	50	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	127	139	170	150	54	132
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	10.7	10.4	9.3
HCM LOS	B	B	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	48%	0%	100%	0%
Vol Thru, %	52%	53%	0%	0%
Vol Right, %	0%	47%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	294	50	121
LT Vol	117	0	50	0
Through Vol	128	156	0	0
RT Vol	0	138	0	121
Lane Flow Rate	266	320	54	132
Geometry Grp	2	2	7	7
Degree of Util (X)	0.36	0.396	0.096	0.188
Departure Headway (Hd)	4.87	4.461	6.349	5.136
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	735	802	561	693
Service Time	2.926	2.511	4.126	2.912
HCM Lane V/C Ratio	0.362	0.399	0.096	0.19
HCM Control Delay	10.7	10.4	9.8	9.1
HCM Lane LOS	B	B	A	A
HCM 95th-tile Q	1.6	1.9	0.3	0.7

**Intersection**

Intersection Delay, s/veh 19.5  
Intersection LOS C













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	89	337	209	202	151	72
Future Vol, veh/h	89	337	209	202	151	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	366	227	220	164	78
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	20	23.5	11.3
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	51%	21%	0%	0%
Vol Thru, %	49%	0%	100%	0%
Vol Right, %	0%	79%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	411	426	151	72
LT Vol	209	89	0	0
Through Vol	202	0	151	0
RT Vol	0	337	0	72
Lane Flow Rate	447	463	164	78
Geometry Grp	5	2	7	7
Degree of Util (X)	0.732	0.696	0.301	0.128
Departure Headway (Hd)	5.902	5.412	6.6	5.885
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	612	662	542	605
Service Time	3.964	3.479	4.381	3.665
HCM Lane V/C Ratio	0.73	0.699	0.303	0.129
HCM Control Delay	23.5	20	12.2	9.5
HCM Lane LOS	C	C	B	A
HCM 95th-tile Q	6.3	5.6	1.3	0.4

HCM 6th Signalized Intersection Summary  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project AM Peak  
To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	195	650	148	296	314
Future Volume (veh/h)	59	195	650	148	296	314
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	64	212	707	161	322	341
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	239	544	763	647	373	1290
Arrive On Green	0.14	0.14	0.42	0.42	0.21	0.71
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	64	212	707	161	322	341
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	2.3	7.1	25.2	4.6	12.2	4.6
Cycle Q Clear(g_c), s	2.3	7.1	25.2	4.6	12.2	4.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	239	544	763	647	373	1290
V/C Ratio(X)	0.27	0.39	0.93	0.25	0.86	0.26
Avail Cap(c_a), veh/h	358	650	804	682	505	1311
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	16.7	18.9	13.0	26.0	3.6
Incr Delay (d2), s/veh	0.6	0.5	16.2	0.2	11.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	2.4	12.1	1.4	5.7	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.1	17.2	35.1	13.2	37.2	3.7
LnGrp LOS	C	B	D	B	D	A
Approach Vol, veh/h	276		868			663
Approach Delay, s/veh	19.5		31.0			20.0
Approach LOS	B		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	19.8	34.4			54.2	14.3
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	14.2	27.2			6.6	9.1
Green Ext Time (p_c), s	0.5	1.4			2.0	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			25.2			
HCM 6th LOS			C			





1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	11.1	37.9	7.6	19.2

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.1	1.3	0.0	0.5
Total Del/Veh (s)	5.5	8.9	18.2	10.9

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	1.9	0.9
Total Del/Veh (s)	17.1	8.9	12.5	13.3	11.3

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.5	2.7	0.8
Total Del/Veh (s)	11.2	12.9	15.3	36.3	19.2

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.8	7.4	25.5	12.6

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.5	1.4	0.0	0.3
Total Del/Veh (s)	12.0	20.8	18.3	5.1	13.9

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	2.2	1.2
Total Del/Veh (s)	14.6	18.2	12.0	13.9

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.4	0.0	0.2	0.5
Total Del/Veh (s)	12.7	7.0	12.2	9.6

3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.3	0.2
Total Del/Veh (s)	9.4	10.3	1.1	7.1

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative plus Project AM Peak  
To SR 49  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	30	3.0	0.275	8.8	LOS A	1.2	29.8	0.65	0.65	0.65	32.8
8	T1	63	3.0	0.275	8.8	LOS A	1.2	29.8	0.65	0.65	0.65	32.8
18	R2	90	3.0	0.275	8.8	LOS A	1.2	29.8	0.65	0.65	0.65	31.9
Approach		183	3.0	0.275	8.8	LOS A	1.2	29.8	0.65	0.65	0.65	32.3
East: Idaho Maryland Rd												
1	L2	264	3.0	0.283	6.8	LOS A	1.2	31.7	0.53	0.47	0.53	31.7
6	T1	163	3.0	0.458	9.3	LOS A	2.7	70.2	0.61	0.62	0.73	32.9
16	R2	264	3.0	0.458	9.3	LOS A	2.7	70.2	0.61	0.62	0.73	31.9
Approach		692	3.0	0.458	8.4	LOS A	2.7	70.2	0.58	0.56	0.65	32.0
North: Main St												
7	L2	143	3.0	0.368	8.0	LOS A	1.6	41.6	0.56	0.53	0.56	32.6
4	T1	197	3.0	0.368	8.0	LOS A	1.6	41.6	0.56	0.53	0.56	32.6
14	R2	209	3.0	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		549	3.0	0.368	5.0	LOS A	1.6	41.6	0.35	0.33	0.35	34.2
West: Main St												
5	L2	321	3.0	0.662	16.0	LOS B	6.2	158.7	0.78	1.02	1.46	28.9
2	T1	201	3.0	0.662	16.0	LOS B	6.2	158.7	0.78	1.02	1.46	28.9
12	R2	16	3.0	0.662	16.0	LOS B	6.2	158.7	0.78	1.02	1.46	28.2
Approach		538	3.0	0.662	16.0	LOS B	6.2	158.7	0.78	1.02	1.46	28.9
All Vehicles		1962	3.0	0.662	9.5	LOS A	6.2	158.7	0.58	0.63	0.79	31.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Thursday, January 2, 2020 4:24:45 PM

Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\36-40 CPP SR 49\8.1.3 CPP To SR 49 AM Peak Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	21
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	79	324	5	0	0	0	0	132	168	177	389	0
Future Vol, veh/h	79	324	5	0	0	0	0	132	168	177	389	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	360	6	0	0	0	0	147	187	197	432	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	16.6	19.2	25.1
HCM LOS	C	C	D

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	33%	0%	100%	0%
Vol Thru, %	44%	67%	97%	0%	100%
Vol Right, %	56%	0%	3%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	300	241	167	177	389
LT Vol	0	79	0	177	0
Through Vol	132	162	162	0	389
RT Vol	168	0	5	0	0
Lane Flow Rate	333	268	186	197	432
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.605	0.542	0.366	0.388	0.791
Departure Headway (Hd)	6.531	7.292	7.103	7.098	6.589
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	550	493	505	505	549
Service Time	4.599	5.064	4.875	4.871	4.361
HCM Lane V/C Ratio	0.605	0.544	0.368	0.39	0.787
HCM Control Delay	19.2	18.4	14	14.3	30
HCM Lane LOS	C	C	B	B	D
HCM 95th-tile Q	4	3.2	1.7	1.8	7.4

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project PM Peak  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	267	38	80	840	150	266
Future Volume (veh/h)	267	38	80	840	150	266
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	297	42	89	933	167	296
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	376	53	110	1209	295	838
Arrive On Green	0.23	0.23	0.36	0.36	0.17	0.17
Sat Flow, veh/h	1603	227	302	3423	1781	1585
Grp Volume(v), veh/h	0	339	546	476	167	296
Grp Sat Flow(s),veh/h/ln	0	1830	1855	1777	1781	1585
Q Serve(g_s), s	0.0	10.4	15.8	13.9	5.1	6.4
Cycle Q Clear(g_c), s	0.0	10.4	15.8	13.9	5.1	6.4
Prop In Lane		0.12	0.16		1.00	1.00
Lane Grp Cap(c), veh/h	0	429	674	645	295	838
V/C Ratio(X)	0.00	0.79	0.81	0.74	0.57	0.35
Avail Cap(c_a), veh/h	0	778	789	755	757	1249
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.4	17.1	16.5	22.9	8.1
Incr Delay (d2), s/veh	0.0	3.3	5.6	3.2	1.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		4.5	7.0	5.5	2.1	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	24.7	22.7	19.7	24.6	8.4
LnGrp LOS	A	C	C	B	C	A
Approach Vol, veh/h	339			1022	463	
Approach Delay, s/veh	24.7			21.3	14.2	
Approach LOS	C			C	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		14.6		18.7		26.3
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+I1), s		8.4		12.4		17.8
Green Ext Time (p_c), s		1.4		1.6		3.8

Intersection Summary

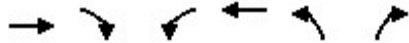
HCM 6th Ctrl Delay	20.1
HCM 6th LOS	C

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project PM Peak  
 To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Traffic Volume (veh/h)	513	77	26	809	108	35
Future Volume (veh/h)	513	77	26	809	108	35
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	590	89	30	930	124	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	875	132	38	1237	166	54
Arrive On Green	0.28	0.28	0.35	0.35	0.13	0.13
Sat Flow, veh/h	3191	466	109	3626	1300	419
Grp Volume(v), veh/h	338	341	514	446	165	0
Grp Sat Flow(s),veh/h/ln1777	1786	1865	1777	1730	0	
Q Serve(g_s), s	9.8	9.9	14.5	12.7	5.4	0.0
Cycle Q Clear(g_c), s	9.8	9.9	14.5	12.7	5.4	0.0
Prop In Lane		0.26	0.06		0.75	0.24
Lane Grp Cap(c), veh/h	502	505	653	622	221	0
V/C Ratio(X)	0.67	0.68	0.79	0.72	0.75	0.00
Avail Cap(c_a), veh/h	1225	1232	807	769	278	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.6	18.6	17.0	16.5	24.6	0.0
Incr Delay (d2), s/veh	1.6	1.6	4.2	2.4	8.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln3.9	3.9	3.9	6.2	5.0	2.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.2	20.2	21.2	18.9	32.7	0.0
LnGrp LOS	C	C	C	B	C	A
Approach Vol, veh/h	679			960	165	
Approach Delay, s/veh	20.2			20.2	32.7	
Approach LOS	C			C	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		12.1		21.2		25.2
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		9.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		7.4		11.9		16.5
Green Ext Time (p_c), s		0.1		4.6		4.0

Intersection Summary

HCM 6th Ctrl Delay	21.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project PM Peak  
 To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖ ↗	↖ ↗		↖ ↗	↖ ↗	↖ ↗	↖ ↗		↖ ↗	↖ ↗	
Traffic Volume (veh/h)	3	71	254	28	34	106	273	615	77	147	534	15
Future Volume (veh/h)	3	71	254	28	34	106	273	615	77	147	534	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	73	262	29	35	109	281	634	79	152	551	15
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	232	491	79	95	151	322	670	84	161	1133	31
Arrive On Green	0.13	0.13	0.13	0.10	0.10	0.10	0.18	0.41	0.41	0.09	0.32	0.32
Sat Flow, veh/h	74	1793	1585	829	1000	1585	1781	1631	203	1781	3534	96
Grp Volume(v), veh/h	76	0	262	64	0	109	281	0	713	152	277	289
Grp Sat Flow(s),veh/h/ln1867	0	1585	1829	0	1585	1781	0	1834	1781	1777	1853	
Q Serve(g_s), s	2.8	0.0	9.9	2.5	0.0	5.1	11.8	0.0	28.7	6.5	9.6	9.6
Cycle Q Clear(g_c), s	2.8	0.0	9.9	2.5	0.0	5.1	11.8	0.0	28.7	6.5	9.6	9.6
Prop In Lane	0.04		1.00	0.45		1.00	1.00		0.11	1.00		0.05
Lane Grp Cap(c), veh/h	241	0	491	174	0	151	322	0	754	161	570	594
V/C Ratio(X)	0.31	0.00	0.53	0.37	0.00	0.72	0.87	0.00	0.95	0.95	0.49	0.49
Avail Cap(c_a), veh/h	241	0	491	356	0	308	347	0	774	161	570	594
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	21.8	32.5	0.0	33.7	30.5	0.0	21.7	34.7	20.9	20.9
Incr Delay (d2), s/veh	0.7	0.0	1.1	1.3	0.0	6.4	20.1	0.0	20.0	55.3	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.3	0.0	0.0	3.9	1.1	0.0	2.2	6.7	0.0	15.4	5.2	3.9	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	0.0	23.0	33.8	0.0	40.0	50.6	0.0	41.8	90.0	21.6	21.6
LnGrp LOS	C	A	C	C	A	D	D	A	D	F	C	C
Approach Vol, veh/h		338			173			994			718	
Approach Delay, s/veh		24.8			37.7			44.3			36.0	
Approach LOS		C			D			D			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	2.0	37.2		15.0	18.9	30.3		12.4				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	32.3			9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+1/3), s	30.7			11.9	13.8	11.6		7.1				
Green Ext Time (p_c), s	0.0	0.8		0.0	0.1	2.8		0.4				

Intersection Summary

HCM 6th Ctrl Delay	38.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↑	↑↑	
Traffic Vol, veh/h	193	91	29	770	723	87
Future Vol, veh/h	193	91	29	770	723	87
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	203	96	31	811	761	92

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1680	427	853	0	-	0
Stage 1	807	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 94	577	784	-	-	-
Stage 1	400	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 90	577	784	-	-	-
Mov Cap-2 Maneuver	279	-	-	-	-	-
Stage 1	384	-	-	-	-	-
Stage 2	408	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	35.3	0.4	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	784	-	279	577	-	-
HCM Lane V/C Ratio	0.039	-	0.728	0.166	-	-
HCM Control Delay (s)	9.8	-	46	12.5	-	-
HCM Lane LOS	A	-	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	5.2	0.6	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon



Intersection	
Intersection Delay, s/veh	49.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	33	24	27	23	40	79	22	406	34	151	574	77
Future Vol, veh/h	33	24	27	23	40	79	22	406	34	151	574	77
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	33	24	27	23	40	80	22	410	34	153	580	78
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	12	12.7	27.3	72.2
HCM LOS	B	B	D	F

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	39%	16%	100%	0%
Vol Thru, %	0%	92%	29%	28%	0%	88%
Vol Right, %	0%	8%	32%	56%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	22	440	84	142	151	651
LT Vol	22	0	33	23	151	0
Through Vol	0	406	24	40	0	574
RT Vol	0	34	27	79	0	77
Lane Flow Rate	22	444	85	143	153	658
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.042	0.777	0.17	0.272	0.277	1.088
Departure Headway (Hd)	7.049	6.485	7.515	7.07	6.549	5.957
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	511	560	480	512	548	612
Service Time	4.749	4.185	5.515	5.07	4.294	3.702
HCM Lane V/C Ratio	0.043	0.793	0.177	0.279	0.279	1.075
HCM Control Delay	10.1	28.2	12	12.7	11.8	86.2
HCM Lane LOS	B	D	B	B	B	F
HCM 95th-tile Q	0.1	7.1	0.6	1.1	1.1	19.3

Intersection						
Int Delay, s/veh	61.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	86	238	245	277	422	124
Future Vol, veh/h	86	238	245	277	422	124
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	93	259	266	301	459	135

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	266	0	-	0	711
Stage 1	-	-	-	-	266
Stage 2	-	-	-	-	445
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1298	-	-	0 ~ 400	773
Stage 1	-	-	-	0	779
Stage 2	-	-	-	0	646
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1298	-	-	- ~ 371	773
Mov Cap-2 Maneuver	-	-	-	- ~ 371	-
Stage 1	-	-	-	-	723
Stage 2	-	-	-	-	646

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	125
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1298	-	-	371	773
HCM Lane V/C Ratio	0.072	-	-	1.236	0.174
HCM Control Delay (s)	8	-	-	158.6	10.6
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	19.7	0.6

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	85	22	15	378	561	64
Future Vol, veh/h	85	22	15	378	561	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	24	16	411	610	70

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1088	645	680	0	-	0
Stage 1	645	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	239	472	912	-	-	-
Stage 1	522	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	235	472	912	-	-	-
Mov Cap-2 Maneuver	430	-	-	-	-	-
Stage 1	513	-	-	-	-	-
Stage 2	647	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	912	-	438	-	-
HCM Lane V/C Ratio	0.018	-	0.266	-	-
HCM Control Delay (s)	9	-	16.2	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	75	0	0	138	0	10
Future Vol, veh/h	75	0	0	138	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	82	0	0	150	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	82	0	232 82
Stage 1	-	-	-	-	82 -
Stage 2	-	-	-	-	150 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1515	-	756 978
Stage 1	-	-	-	-	941 -
Stage 2	-	-	-	-	878 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1515	-	756 978
Mov Cap-2 Maneuver	-	-	-	-	756 -
Stage 1	-	-	-	-	941 -
Stage 2	-	-	-	-	878 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	978	-	-	1515	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project PM Peak  
 To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	348	146	13	410	332	37
Future Volume (veh/h)	348	146	13	410	332	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	435	182	16	512	415	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	617	523	43	874	485	54
Arrive On Green	0.33	0.33	0.02	0.47	0.31	0.31
Sat Flow, veh/h	1870	1585	1781	1870	1581	175
Grp Volume(v), veh/h	435	182	16	512	462	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1760	0
Q Serve(g_s), s	8.5	3.6	0.4	8.4	10.3	0.0
Cycle Q Clear(g_c), s	8.5	3.6	0.4	8.4	10.3	0.0
Prop In Lane		1.00	1.00		0.90	0.10
Lane Grp Cap(c), veh/h	617	523	43	874	540	0
V/C Ratio(X)	0.70	0.35	0.37	0.59	0.85	0.00
Avail Cap(c_a), veh/h	1361	1153	312	1136	646	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.2	10.6	20.0	8.1	13.6	0.0
Incr Delay (d2), s/veh	1.5	0.4	5.2	0.6	9.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	1.1	0.2	2.5	4.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	11.0	25.2	8.8	23.0	0.0
LnGrp LOS	B	B	C	A	C	A
Approach Vol, veh/h	617			528	462	
Approach Delay, s/veh	12.9			9.3	23.0	
Approach LOS	B			A	C	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		17.5	5.7	18.4		24.2
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		12.3	2.4	10.5		10.4
Green Ext Time (p_c), s		0.5	0.0	3.3		2.9
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			14.6			
HCM 6th LOS			B			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	18.7
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	244	140	208	100	163	230
Future Vol, veh/h	244	140	208	100	163	230
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	287	165	245	118	192	271
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	24.7	16.8	14.2
HCM LOS	C	C	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	64%	0%	100%	0%
Vol Thru, %	36%	68%	0%	0%
Vol Right, %	0%	32%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	384	308	163	230
LT Vol	244	0	163	0
Through Vol	140	208	0	0
RT Vol	0	100	0	230
Lane Flow Rate	452	362	192	271
Geometry Grp	2	2	7	7
Degree of Util (X)	0.748	0.585	0.388	0.456
Departure Headway (Hd)	5.963	5.814	7.292	6.068
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	616	491	590
Service Time	4.027	3.884	5.062	3.837
HCM Lane V/C Ratio	0.747	0.588	0.391	0.459
HCM Control Delay	24.7	16.8	14.7	13.9
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	6.6	3.8	1.8	2.4

**Intersection**

Intersection Delay, s/veh 79.9

Intersection LOS F













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	Y
Traffic Vol, veh/h	133	444	429	418	379	139
Future Vol, veh/h	133	444	429	418	379	139
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	160	535	517	504	457	167
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	163.7	495.2	57.2
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	51%	23%	0%	0%
Vol Thru, %	49%	0%	100%	0%
Vol Right, %	0%	77%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	847	577	379	139
LT Vol	429	133	0	0
Through Vol	418	0	379	0
RT Vol	0	444	0	139
Lane Flow Rate	1020	695	457	167
Geometry Grp	5	2	7	7
Degree of Util (X)	2.042	1.272	0.968	0.322
Departure Headway (Hd)	8.031	8.061	10.052	9.313
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	459	459	365	389
Service Time	6.031	6.061	7.752	7.013
HCM Lane V/C Ratio	2.222	1.514	1.252	0.429
HCM Control Delay	495.2	163.7	72.1	16.4
HCM Lane LOS	F	F	F	C
HCM 95th-tile Q	63.8	24	10.7	1.4

HCM 6th Signalized Intersection Summary  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project PM Peak  
To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	157	363	470	48	132	627
Future Volume (veh/h)	157	363	470	48	132	627
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	171	395	511	52	143	682
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	446	564	625	530	187	995
Arrive On Green	0.26	0.26	0.34	0.34	0.11	0.54
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	171	395	511	52	143	682
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	4.4	11.7	13.8	1.2	4.3	14.6
Cycle Q Clear(g_c), s	4.4	11.7	13.8	1.2	4.3	14.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	446	564	625	530	187	995
V/C Ratio(X)	0.38	0.70	0.82	0.10	0.76	0.69
Avail Cap(c_a), veh/h	455	572	1023	867	642	1667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	14.6	16.2	12.1	23.4	8.9
Incr Delay (d2), s/veh	0.5	3.7	2.7	0.1	6.3	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.1	4.9	0.3	1.9	3.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.1	18.4	18.9	12.1	29.7	9.8
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	566		563			825
Approach Delay, s/veh	18.0		18.3			13.2
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.9	24.3			35.2	18.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.3	15.8			16.6	13.7
Green Ext Time (p_c), s	0.3	2.7			4.7	0.1
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			16.0			
HCM 6th LOS			B			





1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	0.3	0.0	0.1
Total Del/Veh (s)	16.5	63.9	10.3	26.9

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.0	0.0	0.4
Total Del/Veh (s)	6.5	9.3	25.9	13.6

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.7	2.1	1.2
Total Del/Veh (s)	22.6	12.1	19.5	21.1	17.2

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.5	2.7	0.7
Total Del/Veh (s)	16.0	14.0	21.1	38.2	21.1

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	9.2	9.9	28.7	14.3

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.6	0.0	0.6
Total Del/Veh (s)	20.7	41.6	48.0	16.0	31.8

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.8	2.7	1.0
Total Del/Veh (s)	12.6	13.5	19.5	14.7

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	0.1	0.2	0.7
Total Del/Veh (s)	25.4	13.8	21.6	19.6

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.5	0.3
Total Del/Veh (s)	15.5	11.1	2.0	9.7

# MOVEMENT SUMMARY

 **Site: 5 [Main St / Idaho Maryland Rd]**

Cumulative plus Project PM Peak  
 To SR 49  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	72	3.0	0.293	7.6	LOS A	1.3	34.4	0.59	0.55	0.59	33.1
8	T1	81	3.0	0.293	7.6	LOS A	1.3	34.4	0.59	0.55	0.59	33.0
18	R2	89	3.0	0.293	7.6	LOS A	1.3	34.4	0.59	0.55	0.59	32.1
Approach		242	3.0	0.293	7.6	LOS A	1.3	34.4	0.59	0.55	0.59	32.7
East: Idaho Maryland Rd												
1	L2	400	3.0	0.415	8.4	LOS A	2.1	53.0	0.58	0.51	0.58	31.0
6	T1	318	3.0	0.566	11.3	LOS B	4.9	126.0	0.67	0.74	0.97	32.0
16	R2	232	3.0	0.566	11.3	LOS B	4.9	126.0	0.67	0.74	0.97	31.1
Approach		949	3.0	0.566	10.1	LOS B	4.9	126.0	0.63	0.65	0.80	31.4
North: Main St												
7	L2	94	3.0	0.463	11.9	LOS B	2.5	63.5	0.69	0.80	1.01	31.2
4	T1	226	3.0	0.463	11.9	LOS B	2.5	63.5	0.69	0.80	1.01	31.1
14	R2	354	3.0	0.218	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		674	3.0	0.463	5.7	LOS A	2.5	63.5	0.33	0.38	0.48	34.0
West: Main St												
5	L2	229	3.0	0.542	13.3	LOS B	3.5	89.9	0.72	0.87	1.16	30.0
2	T1	136	3.0	0.542	13.3	LOS B	3.5	89.9	0.72	0.87	1.16	29.9
12	R2	33	3.0	0.542	13.3	LOS B	3.5	89.9	0.72	0.87	1.16	29.2
Approach		398	3.0	0.542	13.3	LOS B	3.5	89.9	0.72	0.87	1.16	29.9
All Vehicles		2263	3.0	0.566	9.1	LOS A	4.9	126.0	0.55	0.59	0.75	32.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

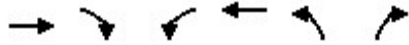
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	20	107	6	0	0	0	0	103	119	101	103	0
Future Vol, veh/h	20	107	6	0	0	0	0	103	119	101	103	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	116	7	0	0	0	0	112	129	110	112	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9.2	10.3	9.2
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	27%	0%	100%	0%
Vol Thru, %	46%	73%	90%	0%	100%
Vol Right, %	54%	0%	10%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	222	74	60	101	103
LT Vol	0	20	0	101	0
Through Vol	103	54	54	0	103
RT Vol	119	0	6	0	0
Lane Flow Rate	241	80	65	110	112
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.327	0.129	0.1	0.173	0.16
Departure Headway (Hd)	4.881	5.796	5.588	5.657	5.154
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	736	617	639	633	695
Service Time	2.919	3.549	3.34	3.397	2.894
HCM Lane V/C Ratio	0.327	0.13	0.102	0.174	0.161
HCM Control Delay	10.3	9.4	9	9.6	8.9
HCM Lane LOS	B	A	A	A	A
HCM 95th-tile Q	1.4	0.4	0.3	0.6	0.6

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

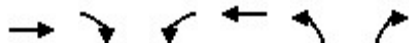
Cumulative plus Project 0630 AM  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	214	15	44	197	119	424
Future Volume (veh/h)	214	15	44	197	119	424
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	233	16	48	214	129	461
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	332	23	112	531	539	762
Arrive On Green	0.19	0.19	0.18	0.18	0.30	0.30
Sat Flow, veh/h	1730	119	630	3079	1781	1585
Grp Volume(v), veh/h	0	249	140	122	129	461
Grp Sat Flow(s),veh/h/ln	0	1849	1839	1777	1781	1585
Q Serve(g_s), s	0.0	5.4	2.9	2.6	2.3	9.2
Cycle Q Clear(g_c), s	0.0	5.4	2.9	2.6	2.3	9.2
Prop In Lane		0.06	0.34		1.00	1.00
Lane Grp Cap(c), veh/h	0	355	327	316	539	762
V/C Ratio(X)	0.00	0.70	0.43	0.39	0.24	0.61
Avail Cap(c_a), veh/h	0	1087	1081	1045	1047	1214
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	16.2	15.7	15.6	11.3	8.2
Incr Delay (d2), s/veh	0.0	2.5	0.9	0.8	0.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr	0.0	2.2	1.1	1.0	0.8	3.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	18.8	16.6	16.4	11.5	9.0
LnGrp LOS	A	B	B	B	B	A
Approach Vol, veh/h	249			262	590	
Approach Delay, s/veh	18.8			16.5	9.5	
Approach LOS	B			B	A	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		17.7		13.0		12.4
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		11.2		7.4		4.9
Green Ext Time (p_c), s		1.9		1.3		1.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			13.3			
HCM 6th LOS			B			
<b>Notes</b>						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	577	77	24	206	45	7
Future Volume (veh/h)	577	77	24	206	45	7
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	627	84	26	224	49	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	1104	148	72	652	108	18
Arrive On Green	0.35	0.35	0.20	0.20	0.07	0.07
Sat Flow, veh/h	3244	421	360	3363	1481	242
Grp Volume(v), veh/h	353	358	134	116	58	0
Grp Sat Flow(s),veh/h/ln1777	1795	1852	1777	1753	0	
Q Serve(g_s), s	6.0	6.0	2.3	2.1	1.2	0.0
Cycle Q Clear(g_c), s	6.0	6.0	2.3	2.1	1.2	0.0
Prop In Lane		0.23	0.19		0.84	0.14
Lane Grp Cap(c), veh/h	622	629	369	354	128	0
V/C Ratio(X)	0.57	0.57	0.36	0.33	0.45	0.00
Avail Cap(c_a), veh/h	1931	1950	1264	1212	492	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.8	9.8	12.8	12.7	16.5	0.0
Incr Delay (d2), s/veh	0.8	0.8	0.6	0.5	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln1.8	1.8	1.8	0.8	0.7	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.6	10.6	13.4	13.3	19.0	0.0
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	711			250	58	
Approach Delay, s/veh	10.6			13.3	19.0	
Approach LOS	B			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		7.3		17.7		12.1
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		10.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		3.2		8.0		4.3
Green Ext Time (p_c), s		0.1		5.0		1.3

Intersection Summary

HCM 6th Ctrl Delay	11.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
 To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↖	↖		↖	↕	↗
Traffic Volume (veh/h)	0	5	147	74	50	89	137	249	11	13	304	5
Future Volume (veh/h)	0	5	147	74	50	89	137	249	11	13	304	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	5	160	80	54	97	149	271	12	14	330	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	220	365	136	92	199	201	484	21	32	636	10
Arrive On Green	0.00	0.12	0.12	0.13	0.13	0.13	0.11	0.27	0.27	0.02	0.18	0.18
Sat Flow, veh/h	0	1870	1585	1084	732	1585	1781	1777	79	1781	3583	54
Grp Volume(v), veh/h	0	5	160	134	0	97	149	0	283	14	163	172
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1816	0	1585	1781	0	1856	1781	1777	1861
Q Serve(g_s), s	0.0	0.1	3.9	3.1	0.0	2.6	3.6	0.0	5.9	0.4	3.8	3.8
Cycle Q Clear(g_c), s	0.0	0.1	3.9	3.1	0.0	2.6	3.6	0.0	5.9	0.4	3.8	3.8
Prop In Lane	0.00		1.00	0.60		1.00	1.00		0.04	1.00		0.03
Lane Grp Cap(c), veh/h	0	220	365	229	0	199	201	0	506	32	316	330
V/C Ratio(X)	0.00	0.02	0.44	0.59	0.00	0.49	0.74	0.00	0.56	0.44	0.52	0.52
Avail Cap(c_a), veh/h	0	411	527	601	0	525	590	0	1208	273	959	1004
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	17.6	14.8	18.6	0.0	18.3	19.3	0.0	14.1	21.9	16.8	16.8
Incr Delay (d2), s/veh	0.0	0.0	0.8	2.4	0.0	1.8	5.4	0.0	1.0	9.3	1.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0	0.0	0.0	1.2	1.3	0.0	0.9	1.5	0.0	2.0	0.2	1.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.6	15.7	21.0	0.0	20.2	24.7	0.0	15.0	31.2	18.1	18.0
LnGrp LOS	A	B	B	C	A	C	C	A	B	C	B	B
Approach Vol, veh/h		165			231			432			349	
Approach Delay, s/veh		15.7			20.6			18.4			18.6	
Approach LOS		B			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s5.9	18.0			10.4	10.2	13.7		10.8				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	29.3			9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+1/4), s	7.9			5.9	5.6	5.8		5.1				
Green Ext Time (p_c), s	0.0	1.4		0.2	0.2	1.6		0.7				

Intersection Summary

HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	30	56	378	396	98
Future Vol, veh/h	20	30	56	378	396	98
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	33	61	411	430	107

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1017	269	537	0	-	0
Stage 1	484	-	-	-	-	-
Stage 2	533	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	248	730	1029	-	-	-
Stage 1	586	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	233	730	1029	-	-	-
Mov Cap-2 Maneuver	433	-	-	-	-	-
Stage 1	551	-	-	-	-	-
Stage 2	587	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	1.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1029	-	433	730	-	-
HCM Lane V/C Ratio	0.059	-	0.05	0.045	-	-
HCM Control Delay (s)	8.7	-	13.8	10.2	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	0.1	-	-

Intersection	
Intersection Delay, s/veh	13
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	27	10	21	28	25	80	23	361	6	25	186	12
Future Vol, veh/h	27	10	21	28	25	80	23	361	6	25	186	12
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	11	23	30	27	87	25	392	7	27	202	13
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.5	10.1	15.7	10.9
HCM LOS	A	B	C	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	21%	100%	0%
Vol Thru, %	0%	98%	17%	19%	0%	94%
Vol Right, %	0%	2%	36%	60%	0%	6%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	23	367	58	133	25	198
LT Vol	23	0	27	28	25	0
Through Vol	0	361	10	25	0	186
RT Vol	0	6	21	80	0	12
Lane Flow Rate	25	399	63	145	27	215
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.041	0.603	0.102	0.22	0.046	0.334
Departure Headway (Hd)	5.957	5.441	5.838	5.47	6.137	5.588
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	605	666	613	656	585	644
Service Time	3.657	3.141	3.881	3.507	3.863	3.314
HCM Lane V/C Ratio	0.041	0.599	0.103	0.221	0.046	0.334
HCM Control Delay	8.9	16.1	9.5	10.1	9.2	11.1
HCM Lane LOS	A	C	A	B	A	B
HCM 95th-tile Q	0.1	4.1	0.3	0.8	0.1	1.5

Intersection						
Int Delay, s/veh	6.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	↗
Traffic Vol, veh/h	122	49	133	258	129	48
Future Vol, veh/h	122	49	133	258	129	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	133	53	145	280	140	52

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	145	0	-	0	464 145
Stage 1	-	-	-	-	145 -
Stage 2	-	-	-	-	319 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1437	-	-	0	556 902
Stage 1	-	-	-	0	882 -
Stage 2	-	-	-	0	737 -
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1437	-	-	-	504 902
Mov Cap-2 Maneuver	-	-	-	-	504 -
Stage 1	-	-	-	-	800 -
Stage 2	-	-	-	-	737 -

Approach	EB	WB	SB
HCM Control Delay, s	5.5	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1437	-	-	504	902
HCM Lane V/C Ratio	0.092	-	-	0.278	0.058
HCM Control Delay (s)	7.8	-	-	14.9	9.2
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	1.1	0.2

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	15	22	336	141	95
Future Vol, veh/h	54	15	22	336	141	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	16	24	365	153	103

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	618	205	256	0	-	0
Stage 1	205	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	453	836	1309	-	-	-
Stage 1	829	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	445	836	1309	-	-	-
Mov Cap-2 Maneuver	595	-	-	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	668	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1309	-	635	-	-
HCM Lane V/C Ratio	0.018	-	0.118	-	-
HCM Control Delay (s)	7.8	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	49	0	0	61	0	10
Future Vol, veh/h	49	0	0	61	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	0	0	66	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	53	0	119 53
Stage 1	-	-	-	-	53 -
Stage 2	-	-	-	-	66 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1553	-	877 1014
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	957 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1553	-	877 1014
Mov Cap-2 Maneuver	-	-	-	-	877 -
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	957 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1014	-	-	1553	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
 To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	176	251	7	149	41	5
Future Volume (veh/h)	176	251	7	149	41	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	191	273	8	162	45	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	613	520	23	1004	112	12
Arrive On Green	0.33	0.33	0.01	0.54	0.07	0.07
Sat Flow, veh/h	1870	1585	1781	1870	1554	173
Grp Volume(v), veh/h	191	273	8	162	51	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1762	0
Q Serve(g_s), s	1.8	3.4	0.1	1.1	0.7	0.0
Cycle Q Clear(g_c), s	1.8	3.4	0.1	1.1	0.7	0.0
Prop In Lane		1.00	1.00		0.88	0.10
Lane Grp Cap(c), veh/h	613	520	23	1004	127	0
V/C Ratio(X)	0.31	0.53	0.35	0.16	0.40	0.00
Avail Cap(c_a), veh/h	2359	1999	541	1970	1122	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.0	6.6	11.8	2.8	10.6	0.0
Incr Delay (d2), s/veh	0.3	0.8	8.6	0.1	2.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.6	0.1	0.1	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.3	7.4	20.4	2.9	12.7	0.0
LnGrp LOS	A	A	C	A	B	A
Approach Vol, veh/h	464			170	51	
Approach Delay, s/veh	6.9			3.7	12.7	
Approach LOS	A			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		6.4	5.0	12.6		17.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		2.7	2.1	5.4		3.1
Green Ext Time (p_c), s		0.1	0.0	2.1		0.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			6.6			
HCM 6th LOS			A			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	50	113	106	68	32	54
Future Vol, veh/h	50	113	106	68	32	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	123	115	74	35	59
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.7	8.3	8.1
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	31%	0%	100%	0%
Vol Thru, %	69%	61%	0%	0%
Vol Right, %	0%	39%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	163	174	32	54
LT Vol	50	0	32	0
Through Vol	113	106	0	0
RT Vol	0	68	0	54
Lane Flow Rate	177	189	35	59
Geometry Grp	2	2	7	7
Degree of Util (X)	0.218	0.217	0.056	0.075
Departure Headway (Hd)	4.424	4.129	5.835	4.627
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	815	872	615	775
Service Time	2.436	2.14	3.559	2.351
HCM Lane V/C Ratio	0.217	0.217	0.057	0.076
HCM Control Delay	8.7	8.3	8.9	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.8	0.8	0.2	0.2

**Intersection**

Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	172	119	82	73	43
Future Vol, veh/h	28	172	119	82	73	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	187	129	89	79	47
Number of Lanes	1	0	0	1	1	1













Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	8.8	9.8	8.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	59%	14%	0%	0%
Vol Thru, %	41%	0%	100%	0%
Vol Right, %	0%	86%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	201	200	73	43
LT Vol	119	28	0	0
Through Vol	82	0	73	0
RT Vol	0	172	0	43
Lane Flow Rate	218	217	79	47
Geometry Grp	5	2	7	7
Degree of Util (X)	0.29	0.258	0.115	0.059
Departure Headway (Hd)	4.786	4.267	5.217	4.512
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	749	841	686	792
Service Time	2.823	2.294	2.957	2.251
HCM Lane V/C Ratio	0.291	0.258	0.115	0.059
HCM Control Delay	9.8	8.8	8.6	7.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.2	1	0.4	0.2



HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 0630 AM  
 To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	79	340	127	209	195
Future Volume (veh/h)	30	79	340	127	209	195
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	33	86	370	138	227	212
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	167	416	545	462	301	1116
Arrive On Green	0.10	0.10	0.30	0.30	0.17	0.61
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	33	86	370	138	227	212
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.6	1.6	6.5	2.5	4.5	1.9
Cycle Q Clear(g_c), s	0.6	1.6	6.5	2.5	4.5	1.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	167	416	545	462	301	1116
V/C Ratio(X)	0.20	0.21	0.68	0.30	0.75	0.19
Avail Cap(c_a), veh/h	671	865	1508	1278	947	2457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	10.3	11.3	9.9	14.4	3.1
Incr Delay (d2), s/veh	0.6	0.2	1.5	0.4	3.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	1.9	0.6	1.6	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.8	10.6	12.8	10.2	18.2	3.2
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	119		508			439
Approach Delay, s/veh	12.0		12.1			11.0
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.4	16.7			28.1	8.4
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	6.5	8.5			3.9	3.6
Green Ext Time (p_c), s	0.5	2.4			1.1	0.2
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.6			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	3.8	15.3	4.4	7.2

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.2	0.0	0.4
Total Del/Veh (s)	3.7	6.3	13.1	7.2

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.3	2.1	1.0
Total Del/Veh (s)	14.8	4.8	8.5	7.1	6.5

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.8	2.9	0.9
Total Del/Veh (s)	4.5	9.0	16.1	39.4	17.7

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.4	3.6	19.9	8.2

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.3	1.5	0.0	0.2
Total Del/Veh (s)	5.7	8.8	10.2	1.0	5.3

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.3	2.1	1.3
Total Del/Veh (s)	12.0	13.5	5.9	8.7

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.9	0.0	0.1	0.3
Total Del/Veh (s)	7.0	5.0	6.5	5.8

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.2	0.1
Total Del/Veh (s)	5.6	7.7	0.4	4.0

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative plus Project 0630-0730 AM  
 To SR 49  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	13	3.0	0.093	5.0	LOS A	0.4	9.7	0.49	0.39	0.49	34.8
8	T1	21	3.0	0.093	5.0	LOS A	0.4	9.7	0.49	0.39	0.49	34.7
18	R2	48	3.0	0.093	5.0	LOS A	0.4	9.7	0.49	0.39	0.49	33.7
Approach		82	3.0	0.093	5.0	LOS A	0.4	9.7	0.49	0.39	0.49	34.1
East: Idaho Maryland Rd												
1	L2	149	3.0	0.131	4.3	LOS A	0.5	13.8	0.34	0.22	0.34	32.8
6	T1	71	3.0	0.165	4.6	LOS A	0.7	17.7	0.35	0.23	0.35	35.3
16	R2	116	3.0	0.165	4.6	LOS A	0.7	17.7	0.35	0.23	0.35	34.2
Approach		336	3.0	0.165	4.5	LOS A	0.7	17.7	0.34	0.22	0.34	33.8
North: Main St												
7	L2	77	3.0	0.215	5.2	LOS A	0.9	22.7	0.37	0.26	0.37	34.3
4	T1	165	3.0	0.215	5.2	LOS A	0.9	22.7	0.37	0.26	0.37	34.2
14	R2	78	3.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		319	3.0	0.215	3.9	LOS A	0.9	22.7	0.28	0.19	0.28	34.9
West: Main St												
5	L2	173	3.0	0.355	7.5	LOS A	1.6	40.7	0.52	0.46	0.52	32.7
2	T1	151	3.0	0.355	7.5	LOS A	1.6	40.7	0.52	0.46	0.52	32.6
12	R2	25	3.0	0.355	7.5	LOS A	1.6	40.7	0.52	0.46	0.52	31.7
Approach		348	3.0	0.355	7.5	LOS A	1.6	40.7	0.52	0.46	0.52	32.6
All Vehicles		1086	3.0	0.355	5.3	LOS A	1.6	40.7	0.39	0.30	0.39	33.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	62	378	5	0	0	0	0	104	170	168	360	0
Future Vol, veh/h	62	378	5	0	0	0	0	104	170	168	360	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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	411	5	0	0	0	0	113	185	183	391	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	16.2	16.8	20.9
HCM LOS	C	C	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	25%	0%	100%	0%
Vol Thru, %	38%	75%	97%	0%	100%
Vol Right, %	62%	0%	3%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	274	251	194	168	360
LT Vol	0	62	0	168	0
Through Vol	104	189	189	0	360
RT Vol	170	0	5	0	0
Lane Flow Rate	298	273	211	183	391
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.535	0.535	0.405	0.359	0.714
Departure Headway (Hd)	6.465	7.059	6.915	7.078	6.568
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	557	510	519	506	548
Service Time	4.53	4.825	4.68	4.844	4.335
HCM Lane V/C Ratio	0.535	0.535	0.407	0.362	0.714
HCM Control Delay	16.8	17.7	14.3	13.8	24.2
HCM Lane LOS	C	C	B	B	C
HCM 95th-tile Q	3.1	3.1	1.9	1.6	5.8

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

MITIG8 Cumulative plus Project 1530 PM  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	342	50	70	681	180	259
Future Volume (veh/h)	342	50	70	681	180	259
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	364	53	74	724	191	276
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	447	65	99	1018	301	756
Arrive On Green	0.28	0.28	0.31	0.31	0.17	0.17
Sat Flow, veh/h	1596	232	322	3403	1781	1585
Grp Volume(v), veh/h	0	417	426	372	191	276
Grp Sat Flow(s),veh/h/ln	0	1829	1854	1777	1781	1585
Q Serve(g_s), s	0.0	12.3	12.0	10.6	5.8	6.4
Cycle Q Clear(g_c), s	0.0	12.3	12.0	10.6	5.8	6.4
Prop In Lane		0.13	0.17		1.00	1.00
Lane Grp Cap(c), veh/h	0	512	570	547	301	756
V/C Ratio(X)	0.00	0.81	0.75	0.68	0.63	0.37
Avail Cap(c_a), veh/h	0	797	808	775	777	1179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	19.5	18.1	17.6	22.4	9.6
Incr Delay (d2), s/veh	0.0	3.7	2.4	1.5	2.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0	0.0	5.2	4.9	4.1	2.4	3.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	23.2	20.4	19.1	24.6	9.9
LnGrp LOS	A	C	C	B	C	A
Approach Vol, veh/h	417			798	467	
Approach Delay, s/veh	23.2			19.8	15.9	
Approach LOS	C			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		14.5		21.0		22.6
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		8.4		14.3		14.0
Green Ext Time (p_c), s		1.4		1.9		3.9

Intersection Summary

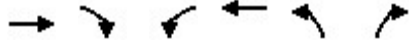
HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 7: Railroad Ave & Idaho Maryland Rd

MITIG8 Cumulative plus Project 1530 PM  
 To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↘
Traffic Volume (veh/h)	500	94	35	649	124	57
Future Volume (veh/h)	500	94	35	649	124	57
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	543	102	38	705	135	62
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	842	158	54	1043	176	81
Arrive On Green	0.28	0.28	0.30	0.30	0.15	0.15
Sat Flow, veh/h	3081	559	178	3554	1169	537
Grp Volume(v), veh/h	322	323	398	345	198	0
Grp Sat Flow(s),veh/h/ln	1777	1770	1861	1777	1715	0
Q Serve(g_s), s	8.4	8.4	10.0	8.9	5.8	0.0
Cycle Q Clear(g_c), s	8.4	8.4	10.0	8.9	5.8	0.0
Prop In Lane		0.32	0.10		0.68	0.31
Lane Grp Cap(c), veh/h	501	499	561	536	258	0
V/C Ratio(X)	0.64	0.65	0.71	0.64	0.77	0.00
Avail Cap(c_a), veh/h	1361	1355	895	854	306	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.6	16.6	16.3	15.9	21.5	0.0
Incr Delay (d2), s/veh	1.4	1.4	1.7	1.3	9.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	3.2	4.0	3.3	2.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.0	18.0	18.0	17.2	30.8	0.0
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	645		743		198	
Approach Delay, s/veh	18.0		17.6		30.8	
Approach LOS	B		B		C	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	12.5		19.5		20.6	
Change Period (Y+Rc), s	4.6		* 4.7		4.7	
Max Green Setting (Gmax), s	9.4		* 40		25.3	
Max Q Clear Time (g_c+I1), s	7.8		10.4		12.0	
Green Ext Time (p_c), s	0.1		4.4		3.9	

Intersection Summary

HCM 6th Ctrl Delay	19.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 Cumulative plus Project 1530 PM  
 To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↗		↖	↗	
Traffic Volume (veh/h)	3	65	217	32	31	69	191	590	70	137	487	14
Future Volume (veh/h)	3	65	217	32	31	69	191	590	70	137	487	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	69	231	34	33	73	203	628	74	146	518	15
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	10	240	432	71	69	121	247	676	80	166	1293	37
Arrive On Green	0.13	0.13	0.13	0.08	0.08	0.08	0.14	0.41	0.41	0.09	0.37	0.37
Sat Flow, veh/h	78	1789	1585	926	898	1585	1781	1642	193	1781	3527	102
Grp Volume(v), veh/h	72	0	231	67	0	73	203	0	702	146	261	272
Grp Sat Flow(s),veh/h/ln	1866	0	1585	1824	0	1585	1781	0	1836	1781	1777	1852
Q Serve(g_s), s	2.6	0.0	9.2	2.6	0.0	3.3	8.2	0.0	26.9	6.0	8.1	8.1
Cycle Q Clear(g_c), s	2.6	0.0	9.2	2.6	0.0	3.3	8.2	0.0	26.9	6.0	8.1	8.1
Prop In Lane	0.04		1.00	0.51		1.00	1.00		0.11	1.00		0.06
Lane Grp Cap(c), veh/h	250	0	432	140	0	121	247	0	756	166	651	679
V/C Ratio(X)	0.29	0.00	0.53	0.48	0.00	0.60	0.82	0.00	0.93	0.88	0.40	0.40
Avail Cap(c_a), veh/h	250	0	432	368	0	320	359	0	802	166	651	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	0.0	22.9	32.7	0.0	33.0	30.9	0.0	20.7	33.1	17.4	17.4
Incr Delay (d2), s/veh	0.6	0.0	1.3	2.5	0.0	4.7	9.5	0.0	16.4	37.4	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	3.4	1.2	0.0	1.4	4.0	0.0	13.9	4.2	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	0.0	24.2	35.2	0.0	37.7	40.5	0.0	37.1	70.5	17.8	17.8
LnGrp LOS	C	A	C	D	A	D	D	A	D	E	B	B
Approach Vol, veh/h		303		140		905		679				
Approach Delay, s/veh		25.4		36.5		37.9		29.1				
Approach LOS		C		D		D		C				
Timer - Assigned Phs	1	2	4	5	6	8						
Phs Duration (G+Y+Rc), s	2.0	36.1	15.0	15.4	32.8	10.8						
Change Period (Y+Rc), s	5.1	5.7	5.1	5.1	5.7	5.1						
Max Green Setting (Gmax), s	9.9	32.3	9.9	14.9	24.3	14.9						
Max Q Clear Time (g_c+1/3), s	11.2	28.9	11.2	10.2	10.1	5.3						
Green Ext Time (p_c), s	0.0	1.5	0.0	0.2	2.7	0.3						

Intersection Summary

HCM 6th Ctrl Delay	33.0
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	141	118	49	685	648	70
Future Vol, veh/h	141	118	49	685	648	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	122	51	706	668	72

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1512	370	740	0	-	0
Stage 1	704	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 121	628	864	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 114	628	864	-	-	-
Mov Cap-2 Maneuver	309	-	-	-	-	-
Stage 1	426	-	-	-	-	-
Stage 2	437	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	864	-	309	628	-	-
HCM Lane V/C Ratio	0.058	-	0.47	0.194	-	-
HCM Control Delay (s)	9.4	-	26.6	12.1	-	-
HCM Lane LOS	A	-	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2.4	0.7	-	-

Notes  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	27.2
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Vol, veh/h	38	33	10	16	25	77	13	376	23	129	465	62
Future Vol, veh/h	38	33	10	16	25	77	13	376	23	129	465	62
Peak Hour Factor	0.94	0.90	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	37	11	17	27	82	14	400	24	137	495	66
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	11.8	11.7	23.2	34.4
HCM LOS	B	B	C	D

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	47%	14%	100%	0%
Vol Thru, %	0%	94%	41%	21%	0%	88%
Vol Right, %	0%	6%	12%	65%	0%	12%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	399	81	118	129	527
LT Vol	13	0	38	16	129	0
Through Vol	0	376	33	25	0	465
RT Vol	0	23	10	77	0	62
Lane Flow Rate	14	424	88	126	137	561
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.026	0.725	0.176	0.234	0.243	0.902
Departure Headway (Hd)	6.698	6.149	7.225	6.709	6.38	5.789
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	531	582	499	539	560	622
Service Time	4.487	3.937	5.234	4.709	4.158	3.567
HCM Lane V/C Ratio	0.026	0.729	0.176	0.234	0.245	0.902
HCM Control Delay	9.7	23.6	11.8	11.7	11.2	40.1
HCM Lane LOS	A	C	B	B	B	E
HCM 95th-tile Q	0.1	6.1	0.6	0.9	0.9	11.1

Intersection						
Int Delay, s/veh	24.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	91	216	191	285	350	117
Future Vol, veh/h	91	216	191	285	350	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	235	208	310	380	127

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	208	0	-	0	641
Stage 1	-	-	-	-	208
Stage 2	-	-	-	-	433
Critical Hdwy	4.12	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.218	-	-	-	3.518
Pot Cap-1 Maneuver	1363	-	-	0	439
Stage 1	-	-	-	0	827
Stage 2	-	-	-	0	654
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1363	-	-	-	407
Mov Cap-2 Maneuver	-	-	-	-	407
Stage 1	-	-	-	-	767
Stage 2	-	-	-	-	654

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	48.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1363	-	-	407	832
HCM Lane V/C Ratio	0.073	-	-	0.935	0.153
HCM Control Delay (s)	7.8	-	-	61.9	10.1
HCM Lane LOS	A	-	-	F	B
HCM 95th %tile Q(veh)	0.2	-	-	10.4	0.5

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	32	9	1	380	482	10
Future Vol, veh/h	32	9	1	380	482	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	10	1	413	524	11

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	945	530	535	0	-	0
Stage 1	530	-	-	-	-	-
Stage 2	415	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	291	549	1033	-	-	-
Stage 1	590	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	291	549	1033	-	-	-
Mov Cap-2 Maneuver	485	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	666	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1033	-	498	-	-
HCM Lane V/C Ratio	0.001	-	0.089	-	-
HCM Control Delay (s)	8.5	-	12.9	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	70	0	0	95	0	10
Future Vol, veh/h	70	0	0	95	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	0	0	103	0	11

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	76	0	179 76
Stage 1	-	-	-	-	76 -
Stage 2	-	-	-	-	103 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1523	-	811 985
Stage 1	-	-	-	-	947 -
Stage 2	-	-	-	-	921 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1523	-	811 985
Mov Cap-2 Maneuver	-	-	-	-	811 -
Stage 1	-	-	-	-	947 -
Stage 2	-	-	-	-	921 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	985	-	-	1523	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

MITIG8 Cumulative plus Project 1530 PM  
 To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	322	146	13	384	332	37
Future Volume (veh/h)	322	146	13	384	332	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	350	159	14	417	361	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	550	466	39	838	454	50
Arrive On Green	0.29	0.29	0.02	0.45	0.29	0.29
Sat Flow, veh/h	1870	1585	1781	1870	1580	175
Grp Volume(v), veh/h	350	159	14	417	402	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1760	0
Q Serve(g_s), s	5.8	2.8	0.3	5.6	7.5	0.0
Cycle Q Clear(g_c), s	5.8	2.8	0.3	5.6	7.5	0.0
Prop In Lane		1.00	1.00		0.90	0.10
Lane Grp Cap(c), veh/h	550	466	39	838	505	0
V/C Ratio(X)	0.64	0.34	0.36	0.50	0.80	0.00
Avail Cap(c_a), veh/h	1596	1353	366	1333	758	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.9	9.8	17.1	7.0	11.7	0.0
Incr Delay (d2), s/veh	1.2	0.4	5.5	0.5	3.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.8	0.2	1.5	2.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.1	10.3	22.7	7.4	15.2	0.0
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h				431	402	
Approach Delay, s/veh				11.5	15.2	
Approach LOS				B	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		14.9	5.5	15.1		20.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		9.5	2.3	7.8		7.6
Green Ext Time (p_c), s		0.7	0.0	2.7		2.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			11.5			
HCM 6th LOS			B			
<b>Notes</b>						
User approved pedestrian interval to be less than phase max green.						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	244	114	182	95	158	230
Future Vol, veh/h	244	114	182	95	158	230
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	265	124	198	103	172	250
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	17.5	13.2	12.6
HCM LOS	C	B	B

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	68%	0%	100%	0%
Vol Thru, %	32%	66%	0%	0%
Vol Right, %	0%	34%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	358	277	158	230
LT Vol	244	0	158	0
Through Vol	114	182	0	0
RT Vol	0	95	0	230
Lane Flow Rate	389	301	172	250
Geometry Grp	2	2	7	7
Degree of Util (X)	0.616	0.461	0.33	0.396
Departure Headway (Hd)	5.696	5.515	6.916	5.696
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	634	650	520	630
Service Time	3.741	3.564	4.662	3.442
HCM Lane V/C Ratio	0.614	0.463	0.331	0.397
HCM Control Delay	17.5	13.2	13.1	12.2
HCM Lane LOS	C	B	B	B
HCM 95th-tile Q	4.2	2.4	1.4	1.9



**Intersection**

Intersection Delay, s/veh 14.3

Intersection LOS F













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘↗			↖↗	↖↗	↘↗
Traffic Vol, veh/h	133	441	426	418	379	139
Future Vol, veh/h	133	441	426	418	379	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	145	479	463	454	412	151
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left SB		EB	
Conflicting Lanes Left	2	1	0
Conflicting Approach Right NB			EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	108.4	393.1	40.5
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	50%	23%	0%	0%
Vol Thru, %	50%	0%	100%	0%
Vol Right, %	0%	77%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	844	574	379	139
LT Vol	426	133	0	0
Through Vol	418	0	379	0
RT Vol	0	441	0	139
Lane Flow Rate	917	624	412	151
Geometry Grp	5	2	7	7
Degree of Util (X)	1.814	1.128	0.872	0.291
Departure Headway (Hd)	7.589	7.712	9.241	8.508
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	486	474	395	426
Service Time	5.589	5.712	6.941	6.208
HCM Lane V/C Ratio	1.887	1.316	1.043	0.354
HCM Control Delay	393.1	108.4	49.9	14.7
HCM Lane LOS	F	F	E	B
HCM 95th-tile Q	54.2	18.3	8.6	1.2

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 1530 PM  
 To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	183	349	412	78	182	460
Future Volume (veh/h)	183	349	412	78	182	460
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	199	379	448	85	198	500
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	424	604	566	480	255	1010
Arrive On Green	0.24	0.24	0.31	0.31	0.15	0.55
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	199	379	448	85	198	500
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	5.2	10.4	11.8	2.1	5.8	8.9
Cycle Q Clear(g_c), s	5.2	10.4	11.8	2.1	5.8	8.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	424	604	566	480	255	1010
V/C Ratio(X)	0.47	0.63	0.79	0.18	0.78	0.49
Avail Cap(c_a), veh/h	465	641	1046	887	657	1704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	13.0	16.6	13.3	21.7	7.2
Incr Delay (d2), s/veh	0.8	1.8	2.5	0.2	5.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	3.3	4.3	0.6	2.3	2.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.8	14.8	19.2	13.4	26.7	7.6
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	578		533			698
Approach Delay, s/veh	15.8		18.2			13.0
Approach LOS	B		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.8	22.1			35.0	17.7
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	7.8	13.8			10.9	12.4
Green Ext Time (p_c), s	0.4	2.5			3.1	0.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			15.5			
HCM 6th LOS			B			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.0
Total Del/Veh (s)	12.6	16.4	5.7	9.7

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	1.0	1.0	0.6
Total Del/Veh (s)	5.0	8.4	17.3	10.0

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.7	2.2	1.2
Total Del/Veh (s)	20.6	10.4	17.3	16.7	14.3

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.6	2.8	0.6
Total Del/Veh (s)	13.5	14.3	17.6	33.8	17.8

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	10.1	10.3	29.1	14.9

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.6	0.0	0.5
Total Del/Veh (s)	20.2	40.9	43.2	14.3	30.0

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.8	2.7	1.0
Total Del/Veh (s)	13.8	14.6	18.6	15.3

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.6	0.0	0.2	0.7
Total Del/Veh (s)	21.1	13.3	20.4	17.6

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.4	0.3
Total Del/Veh (s)	11.7	9.6	1.8	7.6

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative plus Project 1530-1630 PM  
To SR 49  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	57	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	33.3
8	T1	63	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	33.2
18	R2	106	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	32.3
Approach		226	3.0	0.275	7.4	LOS A	1.2	31.8	0.59	0.54	0.59	32.8
East: Idaho Maryland Rd												
1	L2	380	3.0	0.377	7.6	LOS A	1.9	47.4	0.53	0.45	0.53	31.4
6	T1	265	3.0	0.464	8.9	LOS A	2.6	67.0	0.58	0.51	0.60	33.1
16	R2	206	3.0	0.464	8.9	LOS A	2.6	67.0	0.58	0.51	0.60	32.1
Approach		851	3.0	0.464	8.3	LOS A	2.6	67.0	0.55	0.48	0.57	32.1
North: Main St												
7	L2	115	3.0	0.482	11.6	LOS B	2.8	71.3	0.69	0.80	1.01	31.2
4	T1	245	3.0	0.482	11.6	LOS B	2.8	71.3	0.69	0.80	1.01	31.2
14	R2	333	3.0	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		693	3.0	0.482	6.1	LOS A	2.8	71.3	0.36	0.41	0.52	33.8
West: Main St												
5	L2	215	3.0	0.539	13.3	LOS B	3.4	87.6	0.72	0.87	1.16	30.0
2	T1	135	3.0	0.539	13.3	LOS B	3.4	87.6	0.72	0.87	1.16	30.0
12	R2	39	3.0	0.539	13.3	LOS B	3.4	87.6	0.72	0.87	1.16	29.2
Approach		389	3.0	0.539	13.3	LOS B	3.4	87.6	0.72	0.87	1.16	29.9
All Vehicles		2158	3.0	0.539	8.4	LOS A	3.4	87.6	0.52	0.53	0.66	32.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\36-40 CPP SR 49\8.4.3 CPP To SR 49 1530 PM Idaho Main.sip8

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

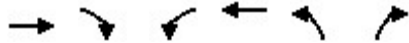
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔		↔	↔	
Traffic Vol, veh/h	37	208	6	0	0	0	0	67	66	118	237	0
Future Vol, veh/h	37	208	6	0	0	0	0	67	66	118	237	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	226	7	0	0	0	0	73	72	128	258	0
Number of Lanes	0	2	0	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	10.4	10.1	11.3
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	26%	0%	100%	0%
Vol Thru, %	50%	74%	95%	0%	100%
Vol Right, %	50%	0%	5%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	133	141	110	118	237
LT Vol	0	37	0	118	0
Through Vol	67	104	104	0	237
RT Vol	66	0	6	0	0
Lane Flow Rate	145	153	120	128	258
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.219	0.255	0.193	0.212	0.39
Departure Headway (Hd)	5.454	5.99	5.819	5.956	5.452
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	652	595	611	599	654
Service Time	3.544	3.779	3.608	3.735	3.231
HCM Lane V/C Ratio	0.222	0.257	0.196	0.214	0.394
HCM Control Delay	10.1	10.8	10	10.4	11.7
HCM Lane LOS	B	B	A	B	B
HCM 95th-tile Q	0.8	1	0.7	0.8	1.8

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	135	28	23	310	73	128
Future Volume (veh/h)	135	28	23	310	73	128
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	30	25	337	79	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	280	57	52	743	354	662
Arrive On Green	0.19	0.19	0.22	0.22	0.20	0.20
Sat Flow, veh/h	1507	308	240	3489	1781	1585
Grp Volume(v), veh/h	0	177	194	168	79	139
Grp Sat Flow(s),veh/h/ln	0	1815	1858	1777	1781	1585
Q Serve(g_s), s	0.0	3.1	3.2	2.9	1.3	2.0
Cycle Q Clear(g_c), s	0.0	3.1	3.2	2.9	1.3	2.0
Prop In Lane		0.17	0.13		1.00	1.00
Lane Grp Cap(c), veh/h	0	337	406	389	354	662
V/C Ratio(X)	0.00	0.52	0.48	0.43	0.22	0.21
Avail Cap(c_a), veh/h	0	1292	1322	1264	1268	1475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	13.1	12.1	12.0	11.9	6.6
Incr Delay (d2), s/veh	0.0	1.3	0.9	0.8	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/lr0.0		1.1	1.1	1.0	0.4	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	14.3	13.0	12.7	12.3	6.8
LnGrp LOS	A	B	B	B	B	A
Approach Vol, veh/h	177			362	218	
Approach Delay, s/veh	14.3			12.9	8.8	
Approach LOS	B			B	A	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		11.8		11.3		12.5
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+l1), s		4.0		5.1		5.2
Green Ext Time (p_c), s		0.6		0.9		2.0

Intersection Summary

HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

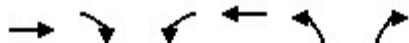
Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



HCM 6th Signalized Intersection Summary  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Volume (veh/h)	246	9	2	291	31	16
Future Volume (veh/h)	246	9	2	291	31	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	267	10	2	316	34	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	743	28	5	789	192	96
Arrive On Green	0.21	0.21	0.22	0.22	0.17	0.17
Sat Flow, veh/h	3587	130	22	3718	1120	560
Grp Volume(v), veh/h	135	142	171	147	52	0
Grp Sat Flow(s),veh/h/ln	1777	1847	1869	1777	1714	0
Q Serve(g_s), s	2.3	2.3	2.8	2.5	0.9	0.0
Cycle Q Clear(g_c), s	2.3	2.3	2.8	2.5	0.9	0.0
Prop In Lane		0.07	0.01		0.65	0.33
Lane Grp Cap(c), veh/h	378	393	407	387	293	0
V/C Ratio(X)	0.36	0.36	0.42	0.38	0.18	0.00
Avail Cap(c_a), veh/h	2040	2120	1347	1281	459	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.8	11.8	11.8	11.7	12.4	0.0
Incr Delay (d2), s/veh	0.6	0.6	0.7	0.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.8	1.0	0.8	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.4	12.3	12.5	12.3	12.7	0.0
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	277			318	52	
Approach Delay, s/veh	12.3			12.4	12.7	
Approach LOS	B			B	B	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		10.6		12.2		12.3
Change Period (Y+Rc), s		4.6		* 4.7		4.7
Max Green Setting (Gmax), s		9.4		* 40		25.3
Max Q Clear Time (g_c+I1), s		2.9		4.3		4.8
Green Ext Time (p_c), s		0.0		1.7		1.7

Intersection Summary

HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
 To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↗		↖	↗	
Traffic Volume (veh/h)	1	34	147	26	16	50	92	255	36	100	313	1
Future Volume (veh/h)	1	34	147	26	16	50	92	255	36	100	313	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	37	160	28	17	54	100	277	39	109	340	1
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	228	348	106	64	148	168	390	55	146	838	2
Arrive On Green	0.13	0.13	0.13	0.09	0.09	0.09	0.09	0.24	0.24	0.08	0.23	0.23
Sat Flow, veh/h	49	1819	1585	1129	685	1585	1781	1604	226	1781	3635	11
Grp Volume(v), veh/h	38	0	160	45	0	54	100	0	316	109	166	175
Grp Sat Flow(s),veh/h/ln	1868	0	1585	1814	0	1585	1781	0	1830	1781	1777	1868
Q Serve(g_s), s	0.8	0.0	4.0	1.1	0.0	1.5	2.5	0.0	7.3	2.8	3.7	3.7
Cycle Q Clear(g_c), s	0.8	0.0	4.0	1.1	0.0	1.5	2.5	0.0	7.3	2.8	3.7	3.7
Prop In Lane	0.03		1.00	0.62		1.00	1.00		0.12	1.00		0.01
Lane Grp Cap(c), veh/h	234	0	348	170	0	148	168	0	444	146	410	431
V/C Ratio(X)	0.16	0.00	0.46	0.26	0.00	0.36	0.60	0.00	0.71	0.75	0.41	0.41
Avail Cap(c_a), veh/h	402	0	490	588	0	513	577	0	1285	267	939	987
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	15.6	19.4	0.0	19.6	20.0	0.0	15.9	20.7	15.0	15.0
Incr Delay (d2), s/veh	0.3	0.0	0.9	0.8	0.0	1.5	3.4	0.0	2.1	7.5	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.3	0.4	0.0	0.5	1.1	0.0	2.9	1.3	1.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	0.0	16.5	20.2	0.0	21.1	23.4	0.0	18.1	28.1	15.7	15.6
LnGrp LOS	B	A	B	C	A	C	C	A	B	C	B	B
Approach Vol, veh/h		198			99			416			450	
Approach Delay, s/veh		16.9			20.7			19.3			18.7	
Approach LOS		B			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	16.9		10.9	9.4	16.3		9.4				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	32.3	32.3		9.9	14.9	24.3		14.9				
Max Q Clear Time (g_c+14), s	9.3	9.3		6.0	4.5	5.7		3.5				
Green Ext Time (p_c), s	0.0	1.9		0.2	0.1	1.8		0.2				

Intersection Summary

HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	57	10	320	456	28
Future Vol, veh/h	34	57	10	320	456	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	200	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	62	11	348	496	30

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	881	263	526	0	-	0
Stage 1	511	-	-	-	-	-
Stage 2	370	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	301	736	1039	-	-	-
Stage 1	568	-	-	-	-	-
Stage 2	698	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	298	736	1039	-	-	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	562	-	-	-	-	-
Stage 2	698	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1039	-	481	736	-	-
HCM Lane V/C Ratio	0.01	-	0.077	0.084	-	-
HCM Control Delay (s)	8.5	-	13.1	10.3	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	0.3	-	-

Intersection	
Intersection Delay, s/veh	12.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	24	25	10	11	15	40	11	228	11	90	343	41
Future Vol, veh/h	24	25	10	11	15	40	11	228	11	90	343	41
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	27	11	12	16	43	12	248	12	98	373	45
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	1	1
HCM Control Delay	9.6	9.3	11.5	14
HCM LOS	A	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	100%	0%	41%	17%	100%	0%
Vol Thru, %	0%	95%	42%	23%	0%	89%
Vol Right, %	0%	5%	17%	61%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	239	59	66	90	384
LT Vol	11	0	24	11	90	0
Through Vol	0	228	25	15	0	343
RT Vol	0	11	10	40	0	41
Lane Flow Rate	12	260	64	72	98	417
Geometry Grp	7	7	2	2	7	7
Degree of Util (X)	0.02	0.388	0.106	0.112	0.154	0.59
Departure Headway (Hd)	5.912	5.375	5.94	5.616	5.666	5.087
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	600	662	607	642	628	701
Service Time	3.704	3.167	3.943	3.619	3.446	2.867
HCM Lane V/C Ratio	0.02	0.393	0.105	0.112	0.156	0.595
HCM Control Delay	8.8	11.6	9.6	9.3	9.5	15
HCM Lane LOS	A	B	A	A	A	B
HCM 95th-tile Q	0.1	1.8	0.4	0.4	0.5	3.9

Intersection						
Int Delay, s/veh	7.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↗		↙	↗
Traffic Vol, veh/h	29	141	81	175	248	50
Future Vol, veh/h	29	141	81	175	248	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Free	-	None
Storage Length	120	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	153	88	190	270	54

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	88	0	0	305	88
Stage 1	-	-	-	88	-
Stage 2	-	-	-	217	-
Critical Hdwy	4.12	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	3.518	3.318
Pot Cap-1 Maneuver	1508	-	0	687	970
Stage 1	-	-	0	935	-
Stage 2	-	-	0	819	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	1508	-	-	673	970
Mov Cap-2 Maneuver	-	-	-	673	-
Stage 1	-	-	-	915	-
Stage 2	-	-	-	819	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	13.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1508	-	-	673	970
HCM Lane V/C Ratio	0.021	-	-	0.401	0.056
HCM Control Delay (s)	7.4	-	-	13.9	8.9
HCM Lane LOS	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	1.9	0.2

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	54	14	14	334	300	64
Future Vol, veh/h	54	14	14	334	300	64
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	15	15	363	326	70

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	754	361	396	0	-	0
Stage 1	361	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	377	684	1163	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	372	684	1163	-	-	-
Mov Cap-2 Maneuver	554	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1163	-	577	-	-
HCM Lane V/C Ratio	0.013	-	0.128	-	-
HCM Control Delay (s)	8.1	-	12.2	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	0.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	0	0	63	0	10
Future Vol, veh/h	48	0	0	63	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	0	0	68	0	11

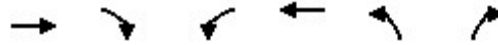
Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	52	0	120 52
Stage 1	-	-	-	-	52 -
Stage 2	-	-	-	-	68 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1554	-	876 1016
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	955 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1554	-	876 1016
Mov Cap-2 Maneuver	-	-	-	-	876 -
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	955 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1016	-	-	1554	-
HCM Lane V/C Ratio	0.011	-	-	-	-
HCM Control Delay (s)	8.6	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
 To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	131	41	3	116	47	12
Future Volume (veh/h)	131	41	3	116	47	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	142	45	3	126	51	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	494	419	9	823	298	76
Arrive On Green	0.26	0.26	0.00	0.44	0.22	0.22
Sat Flow, veh/h	1870	1585	1781	1870	1365	348
Grp Volume(v), veh/h	142	45	3	126	65	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1739	0
Q Serve(g_s), s	1.7	0.6	0.0	1.1	0.8	0.0
Cycle Q Clear(g_c), s	1.7	0.6	0.0	1.1	0.8	0.0
Prop In Lane		1.00	1.00		0.78	0.20
Lane Grp Cap(c), veh/h	494	419	9	823	379	0
V/C Ratio(X)	0.29	0.11	0.34	0.15	0.17	0.00
Avail Cap(c_a), veh/h	2061	1746	473	1720	968	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.1	7.7	13.6	4.6	8.7	0.0
Incr Delay (d2), s/veh	0.3	0.1	21.3	0.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.1	0.1	0.2	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.4	7.8	34.9	4.7	8.9	0.0
LnGrp LOS	A	A	C	A	A	A
Approach Vol, veh/h	187			129	65	
Approach Delay, s/veh	8.2			5.4	8.9	
Approach LOS	A			A	A	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		10.7	4.8	12.0		16.8
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 15	* 7.3	* 30		* 25
Max Q Clear Time (g_c+I1), s		2.8	2.0	3.7		3.1
Green Ext Time (p_c), s		0.1	0.0	0.9		0.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			7.4			
HCM 6th LOS			A			
<b>Notes</b>						
User approved pedestrian interval to be less than phase max green.						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						



Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	81	63	48	32	40	74
Future Vol, veh/h	81	63	48	32	40	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	68	52	35	43	80
Number of Lanes	0	1	1	0	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	1
HCM Control Delay	8.5	7.6	8
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	56%	0%	100%	0%
Vol Thru, %	44%	60%	0%	0%
Vol Right, %	0%	40%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	144	80	40	74
LT Vol	81	0	40	0
Through Vol	63	48	0	0
RT Vol	0	32	0	74
Lane Flow Rate	157	87	43	80
Geometry Grp	2	2	7	7
Degree of Util (X)	0.193	0.101	0.067	0.098
Departure Headway (Hd)	4.436	4.164	5.583	4.378
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	812	863	643	820
Service Time	2.447	2.176	3.3	2.095
HCM Lane V/C Ratio	0.193	0.101	0.067	0.098
HCM Control Delay	8.5	7.6	8.7	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.2	0.3



**Intersection**

Intersection Delay, s/veh	10.5
Intersection LOS	B













Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	81	158	153	120	50
Future Vol, veh/h	82	81	158	153	120	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	88	172	166	130	54
Number of Lanes	1	0	0	1	1	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB		
Conflicting Lanes Left	2	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.6	11.8	8.8
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	SBLn1	SBLn2
Vol Left, %	51%	50%	0%	0%
Vol Thru, %	49%	0%	100%	0%
Vol Right, %	0%	50%	0%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	311	163	120	50
LT Vol	158	82	0	0
Through Vol	153	0	120	0
RT Vol	0	81	0	50
Lane Flow Rate	338	177	130	54
Geometry Grp	5	2	7	7
Degree of Util (X)	0.451	0.244	0.191	0.069
Departure Headway (Hd)	4.803	4.957	5.285	4.579
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	747	721	676	778
Service Time	2.851	3.01	3.041	2.335
HCM Lane V/C Ratio	0.452	0.245	0.192	0.069
HCM Control Delay	11.8	9.6	9.3	7.7
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	2.4	1	0.7	0.2

HCM 6th Signalized Intersection Summary  
 24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 1830 PM  
 To SR 49

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	25	268	24	112	428
Future Volume (veh/h)	43	25	268	24	112	428
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	47	27	291	26	122	465
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	134	286	500	423	187	1015
Arrive On Green	0.08	0.08	0.27	0.27	0.11	0.56
Sat Flow, veh/h	1739	1547	1826	1547	1739	1826
Grp Volume(v), veh/h	47	27	291	26	122	465
Grp Sat Flow(s),veh/h/ln	1739	1547	1826	1547	1739	1826
Q Serve(g_s), s	0.7	0.4	4.0	0.4	2.0	4.4
Cycle Q Clear(g_c), s	0.7	0.4	4.0	0.4	2.0	4.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	134	286	500	423	187	1015
V/C Ratio(X)	0.35	0.09	0.58	0.06	0.65	0.46
Avail Cap(c_a), veh/h	840	914	1890	1601	1186	3078
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	9.9	9.2	7.8	12.5	3.9
Incr Delay (d2), s/veh	1.5	0.1	1.1	0.1	3.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.1	0.9	0.1	0.7	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.3	10.0	10.2	7.9	16.3	4.2
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	74		317			587
Approach Delay, s/veh	12.7		10.0			6.7
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.2	13.8			22.0	7.2
Change Period (Y+Rc), s	5.1	5.8			5.8	4.9
Max Green Setting (Gmax), s	19.9	30.2			49.2	14.1
Max Q Clear Time (g_c+I1), s	4.0	6.0			6.4	2.7
Green Ext Time (p_c), s	0.2	1.6			2.9	0.1
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			8.2			
HCM 6th LOS			A			



1: Tinloy St /Tinloy St & Neal St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	12.3	22.8	5.4	12.4

2: SR 49 On-Ramp/Tinloy St & Auburn St Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.0	0.9	0.0	0.2
Total Del/Veh (s)	4.8	7.2	18.8	9.0

8: Main St & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	1.5	2.1	1.1
Total Del/Veh (s)	16.8	7.6	11.5	11.5	10.2

9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.0	0.4	2.9	0.6
Total Del/Veh (s)	8.8	12.9	13.5	36.8	16.4

10: Brunswick Rd & SR 49/20 EB On Ramp Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.5	4.4	23.0	8.7

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.5	0.0	0.5
Total Del/Veh (s)	9.4	17.5	14.1	3.8	10.7

22: SR 49 EB Ramps & Dorsey Dr Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.8	2.9	1.3
Total Del/Veh (s)	11.3	11.4	5.9	9.3

23: Dorsey Dr & Sr 49 WB Ramps Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	1.0	0.0	0.1	0.4
Total Del/Veh (s)	8.0	8.6	9.1	8.5

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3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp Performance by approach

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Approach	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.3	0.2
Total Del/Veh (s)	6.7	8.0	1.1	4.5

# MOVEMENT SUMMARY

 Site: 5 [Main St / Idaho Maryland Rd]

Cumulative plus Project 1830-1930 PM  
 To SR 49  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: SR 49 Ramps												
3	L2	38	3.0	0.106	4.8	LOS A	0.4	11.2	0.46	0.35	0.46	34.2
8	T1	43	3.0	0.106	4.8	LOS A	0.4	11.2	0.46	0.35	0.46	34.2
18	R2	18	3.0	0.106	4.8	LOS A	0.4	11.2	0.46	0.35	0.46	33.2
Approach		99	3.0	0.106	4.8	LOS A	0.4	11.2	0.46	0.35	0.46	34.0
East: Idaho Maryland Rd												
1	L2	188	3.0	0.174	4.9	LOS A	0.7	18.6	0.39	0.28	0.39	32.6
6	T1	206	3.0	0.274	5.9	LOS A	1.3	32.3	0.43	0.32	0.43	34.7
16	R2	92	3.0	0.274	5.9	LOS A	1.3	32.3	0.43	0.32	0.43	33.6
Approach		486	3.0	0.274	5.5	LOS A	1.3	32.3	0.41	0.30	0.41	33.6
North: Main St												
7	L2	65	3.0	0.245	6.3	LOS A	1.0	25.2	0.49	0.44	0.49	33.8
4	T1	165	3.0	0.245	6.3	LOS A	1.0	25.2	0.49	0.44	0.49	33.8
14	R2	225	3.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.2
Approach		456	3.0	0.245	3.2	LOS A	1.0	25.2	0.25	0.22	0.25	35.3
West: Main St												
5	L2	176	3.0	0.313	7.0	LOS A	1.3	34.2	0.52	0.46	0.52	32.6
2	T1	100	3.0	0.313	7.0	LOS A	1.3	34.2	0.52	0.46	0.52	32.6
12	R2	23	3.0	0.313	7.0	LOS A	1.3	34.2	0.52	0.46	0.52	31.7
Approach		299	3.0	0.313	7.0	LOS A	1.3	34.2	0.52	0.46	0.52	32.5
All Vehicles		1339	3.0	0.313	5.0	LOS A	1.3	34.2	0.38	0.31	0.38	33.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.





Queues  
12: Brunswick Rd & Idaho Maryland Rd

MITIG8 Existing AM Peak  
01/06/2020



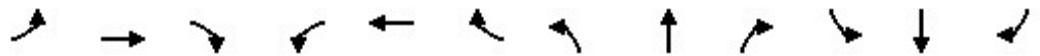
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	168	65	110	222	497	39	331	9
v/c Ratio	0.25	0.26	0.28	0.65	0.49	0.17	0.61	0.02
Control Delay	0.9	29.0	2.7	39.7	17.6	28.8	24.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.9	29.0	2.7	39.7	17.6	28.8	24.3	0.0
Queue Length 50th (ft)	0	22	0	79	111	13	108	0
Queue Length 95th (ft)	0	60	9	#218	#330	42	189	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	740	339	455	339	940	339	876	839
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.19	0.24	0.65	0.53	0.12	0.38	0.01

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 Existing AM Peak  
 01/06/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	158	61	0	103	209	449	18	37	311	8
Future Volume (veh/h)	0	0	158	61	0	103	209	449	18	37	311	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	168	65	0	110	222	478	19	39	331	9
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	209	181	0	161	273	614	24	73	432	366
Arrive On Green	0.00	0.00	0.13	0.10	0.00	0.10	0.15	0.34	0.34	0.04	0.23	0.23
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1787	71	1781	1870	1585
Grp Volume(v), veh/h	0	0	168	65	0	110	222	0	497	39	331	9
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1858	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	5.7	1.9	0.0	3.7	6.6	0.0	13.2	1.2	9.1	0.2
Cycle Q Clear(g_c), s	0.0	0.0	5.7	1.9	0.0	3.7	6.6	0.0	13.2	1.2	9.1	0.2
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	209	181	0	161	273	0	638	73	432	366
V/C Ratio(X)	0.00	0.00	0.80	0.36	0.00	0.68	0.81	0.00	0.78	0.54	0.77	0.02
Avail Cap(c_a), veh/h	0	0	286	321	0	286	321	0	822	321	827	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	23.2	23.0	0.0	23.8	22.5	0.0	16.2	25.8	19.7	16.3
Incr Delay (d2), s/veh	0.0	0.0	11.2	1.2	0.0	5.0	12.9	0.0	3.6	6.0	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.6	0.8	0.0	1.5	3.5	0.0	5.5	0.6	3.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	34.3	24.2	0.0	28.8	35.4	0.0	19.8	31.8	22.6	16.4
LnGrp LOS	A	A	C	C	A	C	D	A	B	C	C	B
Approach Vol, veh/h		168			175			719			379	
Approach Delay, s/veh		34.3			27.1			24.6			23.4	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	24.6		12.3	13.5	18.4		10.7				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9.9	24.3		9.9	9.9	24.3		9.9				
Max Q Clear Time (g_c+I1), s	3.2	15.2		7.7	8.6	11.1		5.7				
Green Ext Time (p_c), s	0.0	2.1		0.2	0.1	1.6		0.2				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			25.7									
HCM 6th LOS			C									



Queues  
12: Brunswick Rd & Idaho Maryland Rd

MITIG8 Existing PM Peak  
01/07/2020



Lane Group	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	202	24	74	241	528	93	459	14
v/c Ratio	0.33	0.13	0.23	0.84	0.68	0.42	0.73	0.02
Control Delay	1.4	31.1	1.6	58.2	22.4	34.9	26.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.4	31.1	1.6	58.2	22.4	34.9	26.2	0.1
Queue Length 50th (ft)	0	9	0	99	184	36	158	0
Queue Length 95th (ft)	0	31	0	#253	303	84	260	0
Internal Link Dist (ft)		1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	680	287	404	287	916	258	895	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.08	0.18	0.84	0.58	0.36	0.51	0.02

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 Existing PM Peak  
 01/07/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↖	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (veh/h)	0	0	196	23	0	72	234	460	52	90	445	14
Future Volume (veh/h)	0	0	196	23	0	72	234	460	52	90	445	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	202	24	0	74	241	474	54	93	459	14
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	282	239	137	0	122	272	629	72	120	554	469
Arrive On Green	0.00	0.00	0.15	0.08	0.00	0.08	0.15	0.38	0.38	0.07	0.30	0.30
Sat Flow, veh/h	0	1870	1585	1781	0	1585	1781	1649	188	1781	1870	1585
Grp Volume(v), veh/h	0	0	202	24	0	74	241	0	528	93	459	14
Grp Sat Flow(s),veh/h/ln	0	1870	1585	1781	0	1585	1781	0	1837	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	8.0	0.8	0.0	2.9	8.6	0.0	16.2	3.3	14.8	0.4
Cycle Q Clear(g_c), s	0.0	0.0	8.0	0.8	0.0	2.9	8.6	0.0	16.2	3.3	14.8	0.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	0	282	239	137	0	122	272	0	700	120	554	469
V/C Ratio(X)	0.00	0.00	0.85	0.18	0.00	0.61	0.89	0.00	0.75	0.77	0.83	0.03
Avail Cap(c_a), veh/h	0	285	242	272	0	242	272	0	830	244	845	716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	26.8	28.0	0.0	29.0	26.9	0.0	17.4	29.8	21.3	16.2
Incr Delay (d2), s/veh	0.0	0.0	22.9	0.6	0.0	4.8	27.6	0.0	3.3	10.0	4.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.4	0.4	0.0	1.2	5.5	0.0	6.8	1.7	6.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	49.7	28.6	0.0	33.8	54.5	0.0	20.7	39.8	25.5	16.2
LnGrp LOS	A	A	D	C	A	C	D	A	C	D	C	B
Approach Vol, veh/h		202			98			769			566	
Approach Delay, s/veh		49.7			32.6			31.3			27.6	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.5	30.4		14.9	15.0	24.9		10.1				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	8.9	29.3		9.9	9.9	29.3		9.9				
Max Q Clear Time (g_c+I1), s	5.3	18.2		10.0	10.6	16.8		4.9				
Green Ext Time (p_c), s	0.1	2.6		0.0	0.0	2.4		0.1				

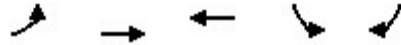
Intersection Summary

HCM 6th Ctrl Delay	32.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Queues  
15: SR 174 & Brunswick Rd



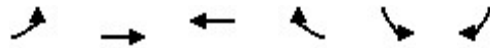
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	78	246	536	420	116
v/c Ratio	0.51	0.28	0.82	0.74	0.20
Control Delay	43.7	11.8	32.0	26.4	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.7	11.8	32.0	26.4	4.1
Queue Length 50th (ft)	28	49	158	137	0
Queue Length 95th (ft)	#94	119	#405	222	27
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	154	975	650	923	881
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.51	0.25	0.82	0.46	0.13

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
15: SR 174 & Brunswick Rd

MITIG8 Existing PM Peak  
01/07/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	72	226	239	254	386	107	
Future Volume (veh/h)	72	226	239	254	386	107	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	78	246	260	0	420	116	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	129	757	381		540	481	
Arrive On Green	0.07	0.40	0.20	0.00	0.30	0.30	
Sat Flow, veh/h	1781	1870	1870	0	1781	1585	
Grp Volume(v), veh/h	78	246	260	0	420	116	
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585	
Q Serve(g_s), s	1.7	3.6	5.1	0.0	8.5	2.2	
Cycle Q Clear(g_c), s	1.7	3.6	5.1	0.0	8.5	2.2	
Prop In Lane	1.00			0.00	1.00	1.00	
Lane Grp Cap(c), veh/h	129	757	381		540	481	
V/C Ratio(X)	0.60	0.32	0.68		0.78	0.24	
Avail Cap(c_a), veh/h	224	942	942		1345	1197	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	17.9	8.1	14.6	0.0	12.6	10.4	
Incr Delay (d2), s/veh	4.5	0.2	2.2	0.0	2.5	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.7	0.9	1.8	0.0	2.5	0.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	22.3	8.4	16.8	0.0	15.1	10.7	
LnGrp LOS	C	A	B		B	B	
Approach Vol, veh/h		324	260	A	536		
Approach Delay, s/veh		11.7	16.8		14.1		
Approach LOS		B	B		B		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				21.2	18.5	8.0	13.2
Change Period (Y+Rc), s				5.1	6.5	5.1	5.1
Max Green Setting (Gmax), s				20.0	30.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				5.6	10.5	3.7	7.1
Green Ext Time (p_c), s				1.0	1.5	0.0	1.0
<b>Intersection Summary</b>							
HCM 6th Ctrl Delay			14.0				
HCM 6th LOS			B				
<b>Notes</b>							
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.							



Queues  
19: Centennial Dr & Idaho Maryland Rd

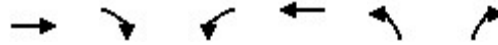
MITIG8 Existing PM Peak  
01/07/2020



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	325	146	11	446	340
v/c Ratio	0.47	0.21	0.04	0.59	0.57
Control Delay	13.8	3.8	21.8	13.0	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	3.8	21.8	13.0	16.3
Queue Length 50th (ft)	44	0	2	66	50
Queue Length 95th (ft)	144	24	16	143	149
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1122	1011	290	1550	1061
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.14	0.04	0.29	0.32
<b>Intersection Summary</b>					

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

MITIG8 Existing PM Peak  
 01/07/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	260	117	9	357	240	32
Future Volume (veh/h)	260	117	9	357	240	32
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	325	146	11	446	300	40
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	527	446	31	836	397	53
Arrive On Green	0.28	0.28	0.02	0.45	0.26	0.26
Sat Flow, veh/h	1870	1585	1781	1870	1545	206
Grp Volume(v), veh/h	325	146	11	446	341	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1756	0
Q Serve(g_s), s	4.8	2.3	0.2	5.5	5.7	0.0
Cycle Q Clear(g_c), s	4.8	2.3	0.2	5.5	5.7	0.0
Prop In Lane		1.00	1.00		0.88	0.12
Lane Grp Cap(c), veh/h	527	446	31	836	452	0
V/C Ratio(X)	0.62	0.33	0.35	0.53	0.75	0.00
Avail Cap(c_a), veh/h	1295	1097	336	1295	1215	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.9	9.0	15.4	6.4	10.9	0.0
Incr Delay (d2), s/veh	1.2	0.4	6.7	0.5	2.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.6	0.1	1.3	1.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.1	9.5	22.1	6.9	13.5	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h				457	341	
Approach Delay, s/veh				10.6	13.5	
Approach LOS				B	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		12.9	5.3	13.7		18.9
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 22	* 6	* 22		* 22
Max Q Clear Time (g_c+I1), s		7.7	2.2	6.8		7.5
Green Ext Time (p_c), s		0.9	0.0	2.2		2.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			10.2			
HCM 6th LOS			B			

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved volume balancing among the lanes for turning movement.
- \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



# MOVEMENT SUMMARY

 Site: 15 [SR 174 / Brunswick Road]

MITIG8 Exist PM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: RoadName												
6	T1	260	3.0	0.434	7.3	LOS A	2.9	73.2	0.32	0.16	0.32	34.0
16	R2	276	3.0	0.434	7.3	LOS A	2.9	73.2	0.32	0.16	0.32	33.0
Approach		536	3.0	0.434	7.3	LOS A	2.9	73.2	0.32	0.16	0.32	33.5
North: RoadName												
7	L2	420	3.0	0.515	9.7	LOS A	3.3	84.4	0.60	0.48	0.60	31.0
14	R2	116	3.0	0.515	9.7	LOS A	3.3	84.4	0.60	0.48	0.60	30.1
Approach		536	3.0	0.515	9.7	LOS A	3.3	84.4	0.60	0.48	0.60	30.8
West: RoadName												
5	L2	78	3.0	0.376	8.5	LOS A	1.9	47.9	0.61	0.57	0.61	32.8
2	T1	246	3.0	0.376	8.5	LOS A	1.9	47.9	0.61	0.57	0.61	32.8
Approach		324	3.0	0.376	8.5	LOS A	1.9	47.9	0.61	0.57	0.61	32.8
All Vehicles		1396	3.0	0.515	8.5	LOS A	3.3	84.4	0.49	0.38	0.50	32.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Queues  
12: Brunswick Rd & Idaho Maryland Rd

MITIG8 Existing 1530  
01/06/2020



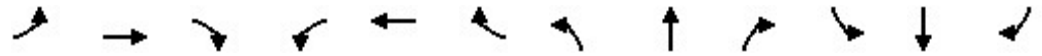
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	203	28	50	193	531	89	444	14
v/c Ratio	0.34	0.13	0.14	0.63	0.66	0.47	0.75	0.02
Control Delay	1.5	29.2	0.9	37.8	19.7	38.9	27.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.5	29.2	0.9	37.8	19.7	38.9	27.1	0.1
Queue Length 50th (ft)	0	10	0	71	170	33	152	0
Queue Length 95th (ft)	0	34	0	#183	287	#98	255	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	679	320	436	320	1001	191	876	836
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.09	0.11	0.60	0.53	0.47	0.51	0.02

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 Existing 1530  
 01/06/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	191	26	0	47	181	452	47	84	417	13
Future Volume (veh/h)	0	0	191	26	0	47	181	452	47	84	417	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	203	28	0	50	193	481	50	89	444	14
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	243	130	0	116	239	594	62	115	536	455
Arrive On Green	0.00	0.00	0.15	0.07	0.00	0.07	0.13	0.36	0.36	0.06	0.29	0.29
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1666	173	1781	1870	1585
Grp Volume(v), veh/h	0	0	203	28	0	50	193	0	531	89	444	14
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1839	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	7.4	0.9	0.0	1.8	6.3	0.0	15.6	2.9	13.2	0.4
Cycle Q Clear(g_c), s	0.0	0.0	7.4	0.9	0.0	1.8	6.3	0.0	15.6	2.9	13.2	0.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	243	130	0	116	239	0	656	115	536	455
V/C Ratio(X)	0.00	0.00	0.83	0.22	0.00	0.43	0.81	0.00	0.81	0.77	0.83	0.03
Avail Cap(c_a), veh/h	0	0	266	299	0	266	299	0	802	179	816	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	24.5	26.0	0.0	26.4	25.0	0.0	17.3	27.4	19.9	15.3
Incr Delay (d2), s/veh	0.0	0.0	18.7	0.8	0.0	2.5	12.2	0.0	5.2	10.4	4.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.9	0.4	0.0	0.7	3.1	0.0	6.2	1.4	5.4	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	43.2	26.8	0.0	29.0	37.2	0.0	22.5	37.9	24.2	15.3
LnGrp LOS	A	A	D	C	A	C	D	A	C	D	C	B
Approach Vol, veh/h		203			78			724			547	
Approach Delay, s/veh		43.2			28.2			26.4			26.2	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	27.0		14.2	13.1	22.8		9.5				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	6.0	26.0		10.0	10.0	26.0		10.0				
Max Q Clear Time (g_c+I1), s	4.9	17.6		9.4	8.3	15.2		3.8				
Green Ext Time (p_c), s	0.0	2.0		0.1	0.1	1.9		0.1				

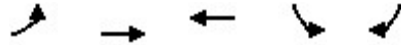
Intersection Summary

HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Queues  
15: SR 174 & Brunswick Rd



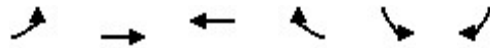
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	87	225	503	359	113
v/c Ratio	0.47	0.26	0.79	0.69	0.21
Control Delay	38.6	9.5	23.7	25.5	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	9.5	23.7	25.5	5.0
Queue Length 50th (ft)	30	40	113	109	0
Queue Length 95th (ft)	#94	83	#270	199	30
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	184	1189	840	744	731
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.47	0.19	0.60	0.48	0.15

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 15: SR 174 & Brunswick Rd

MITIG8 Existing 1530  
 01/06/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	79	205	186	272	327	103	
Future Volume (veh/h)	79	205	186	272	327	103	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	87	225	204	0	359	113	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	141	795	393		474	422	
Arrive On Green	0.08	0.43	0.21	0.00	0.27	0.27	
Sat Flow, veh/h	1781	1870	1870	0	1781	1585	
Grp Volume(v), veh/h	87	225	204	0	359	113	
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585	
Q Serve(g_s), s	1.8	3.0	3.6	0.0	7.0	2.1	
Cycle Q Clear(g_c), s	1.8	3.0	3.6	0.0	7.0	2.1	
Prop In Lane	1.00			0.00	1.00	1.00	
Lane Grp Cap(c), veh/h	141	795	393		474	422	
V/C Ratio(X)	0.62	0.28	0.52		0.76	0.27	
Avail Cap(c_a), veh/h	237	1074	1074		957	851	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	16.8	7.1	13.2	0.0	12.7	10.9	
Incr Delay (d2), s/veh	4.3	0.2	1.1	0.0	2.5	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.7	0.7	1.2	0.0	2.1	0.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	21.0	7.3	14.2	0.0	15.2	11.2	
LnGrp LOS	C	A	B		B	B	
Approach Vol, veh/h		312	204	A	472		
Approach Delay, s/veh		11.1	14.2		14.2		
Approach LOS		B	B		B		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				21.1	16.5	8.1	13.0
Change Period (Y+Rc), s				5.1	6.5	5.1	5.1
Max Green Setting (Gmax), s				21.6	20.2	5.0	21.6
Max Q Clear Time (g_c+I1), s				5.0	9.0	3.8	5.6
Green Ext Time (p_c), s				1.0	1.1	0.0	0.8
<b>Intersection Summary</b>							
HCM 6th Ctrl Delay			13.2				
HCM 6th LOS			B				
<b>Notes</b>							
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.							



Queues  
 19: Centennial Dr & Idaho Maryland Rd

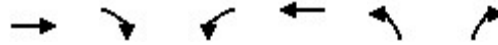
MITIG8 Existing 1530  
 01/06/2020



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	325	146	11	446	340
v/c Ratio	0.47	0.21	0.04	0.59	0.57
Control Delay	13.8	3.8	21.8	13.0	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	3.8	21.8	13.0	16.3
Queue Length 50th (ft)	44	0	2	66	50
Queue Length 95th (ft)	144	24	16	143	149
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1122	1011	290	1550	1061
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.14	0.04	0.29	0.32
<b>Intersection Summary</b>					

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

MITIG8 Existing 1530  
 01/06/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	260	117	9	357	240	32
Future Volume (veh/h)	260	117	9	357	240	32
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	325	146	11	446	300	40
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	527	446	31	836	397	53
Arrive On Green	0.28	0.28	0.02	0.45	0.26	0.26
Sat Flow, veh/h	1870	1585	1781	1870	1545	206
Grp Volume(v), veh/h	325	146	11	446	341	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1756	0
Q Serve(g_s), s	4.8	2.3	0.2	5.5	5.7	0.0
Cycle Q Clear(g_c), s	4.8	2.3	0.2	5.5	5.7	0.0
Prop In Lane		1.00	1.00		0.88	0.12
Lane Grp Cap(c), veh/h	527	446	31	836	452	0
V/C Ratio(X)	0.62	0.33	0.35	0.53	0.75	0.00
Avail Cap(c_a), veh/h	1295	1097	336	1295	1215	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.9	9.0	15.4	6.4	10.9	0.0
Incr Delay (d2), s/veh	1.2	0.4	6.7	0.5	2.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.6	0.1	1.3	1.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.1	9.5	22.1	6.9	13.5	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h				457	341	
Approach Delay, s/veh				10.6	13.5	
Approach LOS				B	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		12.9	5.3	13.7		18.9
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 22	* 6	* 22		* 22
Max Q Clear Time (g_c+I1), s		7.7	2.2	6.8		7.5
Green Ext Time (p_c), s		0.9	0.0	2.2		2.4
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			10.2			
HCM 6th LOS			B			
<b>Notes</b>						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						



# MOVEMENT SUMMARY

 Site: 15 [SR 174 / Brunswick Road]

MITIG8 Exist 1530  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: RoadName												
6	T1	202	3.0	0.407	7.0	LOS A	2.6	65.5	0.32	0.17	0.32	34.1
16	R2	296	3.0	0.407	7.0	LOS A	2.6	65.5	0.32	0.17	0.32	33.1
Approach		498	3.0	0.407	7.0	LOS A	2.6	65.5	0.32	0.17	0.32	33.5
North: RoadName												
7	L2	355	3.0	0.422	7.7	LOS A	2.5	63.9	0.49	0.35	0.49	31.9
14	R2	112	3.0	0.422	7.7	LOS A	2.5	63.9	0.49	0.35	0.49	31.0
Approach		467	3.0	0.422	7.7	LOS A	2.5	63.9	0.49	0.35	0.49	31.6
West: RoadName												
5	L2	86	3.0	0.335	7.5	LOS A	1.7	42.5	0.56	0.48	0.56	33.2
2	T1	223	3.0	0.335	7.5	LOS A	1.7	42.5	0.56	0.48	0.56	33.2
Approach		309	3.0	0.335	7.5	LOS A	1.7	42.5	0.56	0.48	0.56	33.2
All Vehicles		1274	3.0	0.422	7.4	LOS A	2.6	65.5	0.44	0.31	0.44	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Tuesday, January 7, 2020 10:47:59 AM

Project: C:\Users\JDF\KDA\Reports\Nevada County\ldaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 4.1 Exist 1530.sip8

Queues  
12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP AM Peak  
01/06/2020



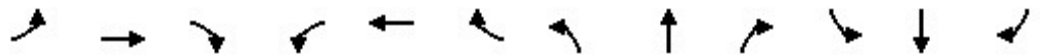
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	177	68	114	233	505	40	344	9
v/c Ratio	0.27	0.27	0.29	0.69	0.50	0.18	0.63	0.02
Control Delay	1.0	29.2	3.1	41.9	17.9	28.8	24.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.0	29.2	3.1	41.9	17.9	28.8	24.8	0.0
Queue Length 50th (ft)	0	23	0	84	114	14	114	0
Queue Length 95th (ft)	0	62	10	#230	#341	42	197	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	729	337	454	337	939	337	871	835
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.20	0.25	0.69	0.54	0.12	0.39	0.01

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP AM Peak  
 01/06/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	166	64	0	107	219	456	19	38	323	8
Future Volume (veh/h)	0	0	166	64	0	107	219	456	19	38	323	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	177	68	0	114	233	485	20	40	344	9
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	218	183	0	163	282	625	26	73	436	370
Arrive On Green	0.00	0.00	0.14	0.10	0.00	0.10	0.16	0.35	0.35	0.04	0.23	0.23
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1784	74	1781	1870	1585
Grp Volume(v), veh/h	0	0	177	68	0	114	233	0	505	40	344	9
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1857	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	6.2	2.0	0.0	4.0	7.2	0.0	13.8	1.3	9.9	0.2
Cycle Q Clear(g_c), s	0.0	0.0	6.2	2.0	0.0	4.0	7.2	0.0	13.8	1.3	9.9	0.2
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	218	183	0	163	282	0	651	73	436	370
V/C Ratio(X)	0.00	0.00	0.81	0.37	0.00	0.70	0.83	0.00	0.78	0.55	0.79	0.02
Avail Cap(c_a), veh/h	0	0	275	309	0	275	309	0	791	309	797	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	23.9	23.9	0.0	24.7	23.2	0.0	16.5	26.8	20.5	16.9
Incr Delay (d2), s/veh	0.0	0.0	13.6	1.3	0.0	5.4	15.4	0.0	4.0	6.2	3.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.0	0.9	0.0	1.6	3.8	0.0	5.4	0.6	4.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	37.5	25.1	0.0	30.1	38.7	0.0	20.5	33.0	23.7	16.9
LnGrp LOS	A	A	D	C	A	C	D	A	C	C	C	B
Approach Vol, veh/h		177			182			738			393	
Approach Delay, s/veh		37.5			28.3			26.2			24.5	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	25.7		12.9	14.1	19.0		11.0				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9.9	24.3		9.9	9.9	24.3		9.9				
Max Q Clear Time (g_c+I1), s	3.3	15.8		8.2	9.2	11.9		6.0				
Green Ext Time (p_c), s	0.0	1.9		0.2	0.0	1.5		0.2				

Intersection Summary

HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.



Queues  
12: Brunswick Rd & Idaho Maryland Rd



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	215	26	78	255	546	97	473	14
v/c Ratio	0.36	0.14	0.24	0.90	0.69	0.44	0.74	0.02
Control Delay	1.6	31.4	1.7	66.9	22.9	35.8	26.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.6	31.4	1.7	66.9	22.9	35.8	26.5	0.1
Queue Length 50th (ft)	0	10	0	108	193	38	165	0
Queue Length 95th (ft)	0	33	0	#271	319	88	272	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	675	284	402	284	906	255	886	841
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.09	0.19	0.90	0.60	0.38	0.53	0.02

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP PM Peak  
 01/06/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	209	25	0	76	247	472	57	94	459	14
Future Volume (veh/h)	0	0	209	25	0	76	247	472	57	94	459	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	215	26	0	78	255	487	59	97	473	14
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	238	138	0	123	268	626	76	125	566	480
Arrive On Green	0.00	0.00	0.15	0.08	0.00	0.08	0.15	0.38	0.38	0.07	0.30	0.30
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1636	198	1781	1870	1585
Grp Volume(v), veh/h	0	0	215	26	0	78	255	0	546	97	473	14
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1835	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	8.8	0.9	0.0	3.1	9.3	0.0	17.2	3.5	15.5	0.4
Cycle Q Clear(g_c), s	0.0	0.0	8.8	0.9	0.0	3.1	9.3	0.0	17.2	3.5	15.5	0.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	238	138	0	123	268	0	702	125	566	480
V/C Ratio(X)	0.00	0.00	0.90	0.19	0.00	0.63	0.95	0.00	0.78	0.77	0.84	0.03
Avail Cap(c_a), veh/h	0	0	238	268	0	238	268	0	817	241	833	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	27.5	28.4	0.0	29.5	27.7	0.0	17.9	30.1	21.4	16.2
Incr Delay (d2), s/veh	0.0	0.0	33.4	0.7	0.0	5.3	41.8	0.0	4.1	9.7	4.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.4	0.4	0.0	1.3	6.9	0.0	7.3	1.8	7.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	60.9	29.1	0.0	34.8	69.6	0.0	22.0	39.7	26.3	16.2
LnGrp LOS	A	A	E	C	A	C	E	A	C	D	C	B
Approach Vol, veh/h		215			104			801			584	
Approach Delay, s/veh		60.9			33.3			37.1			28.3	
Approach LOS		E			C			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.7	30.9		15.0	15.0	25.6		10.2				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	8.9	29.3		9.9	9.9	29.3		9.9				
Max Q Clear Time (g_c+I1), s	5.5	19.2		10.8	11.3	17.5		5.1				
Green Ext Time (p_c), s	0.1	2.6		0.0	0.0	2.4		0.1				

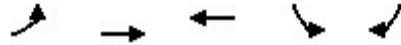
Intersection Summary

HCM 6th Ctrl Delay	36.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Queues  
15: SR 174 & Brunswick Rd



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	80	246	545	427	120
v/c Ratio	0.52	0.28	0.84	0.74	0.20
Control Delay	44.8	12.0	33.5	26.5	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	12.0	33.5	26.5	4.0
Queue Length 50th (ft)	29	49	163	140	0
Queue Length 95th (ft)	#98	121	#417	226	27
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	153	970	648	919	880
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.52	0.25	0.84	0.46	0.14

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
15: SR 174 & Brunswick Rd

MITIG8 EPAP PM Peak  
01/06/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	74	226	239	262	393	110	
Future Volume (veh/h)	74	226	239	262	393	110	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	80	246	260	0	427	120	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	131	755	380		547	487	
Arrive On Green	0.07	0.40	0.20	0.00	0.31	0.31	
Sat Flow, veh/h	1781	1870	1870	0	1781	1585	
Grp Volume(v), veh/h	80	246	260	0	427	120	
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585	
Q Serve(g_s), s	1.7	3.6	5.2	0.0	8.8	2.3	
Cycle Q Clear(g_c), s	1.7	3.6	5.2	0.0	8.8	2.3	
Prop In Lane	1.00			0.00	1.00	1.00	
Lane Grp Cap(c), veh/h	131	755	380		547	487	
V/C Ratio(X)	0.61	0.33	0.68		0.78	0.25	
Avail Cap(c_a), veh/h	222	933	933		1332	1186	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	18.0	8.2	14.8	0.0	12.7	10.4	
Incr Delay (d2), s/veh	4.5	0.2	2.2	0.0	2.5	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.7	0.9	1.8	0.0	2.6	0.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	22.6	8.5	17.0	0.0	15.1	10.7	
LnGrp LOS	C	A	B		B	B	
Approach Vol, veh/h		326	260	A	547		
Approach Delay, s/veh		11.9	17.0		14.2		
Approach LOS		B	B		B		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				21.3	18.8	8.0	13.2
Change Period (Y+Rc), s				5.1	6.5	5.1	5.1
Max Green Setting (Gmax), s				20.0	30.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				5.6	10.8	3.7	7.2
Green Ext Time (p_c), s				1.0	1.6	0.0	1.0

Intersection Summary

HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Queues  
19: Centennial Dr & Idaho Maryland Rd

MITIG8 EPAP PM Peak  
01/06/2020



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	374	150	15	481	352
v/c Ratio	0.52	0.21	0.05	0.62	0.59
Control Delay	14.6	3.8	22.3	13.6	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	3.8	22.3	13.6	17.2
Queue Length 50th (ft)	56	0	3	77	57
Queue Length 95th (ft)	167	24	19	157	154
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1078	979	279	1513	1019
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.15	0.05	0.32	0.35

Intersection Summary

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd

MITIG8 EPAP PM Peak  
 01/06/2020



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	299	120	12	385	245	37
Future Volume (veh/h)	299	120	12	385	245	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	374	150	15	481	306	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	566	480	42	866	399	60
Arrive On Green	0.30	0.30	0.02	0.46	0.26	0.26
Sat Flow, veh/h	1870	1585	1781	1870	1520	228
Grp Volume(v), veh/h	374	150	15	481	353	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1753	0
Q Serve(g_s), s	6.0	2.5	0.3	6.4	6.4	0.0
Cycle Q Clear(g_c), s	6.0	2.5	0.3	6.4	6.4	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	566	480	42	866	460	0
V/C Ratio(X)	0.66	0.31	0.36	0.56	0.77	0.00
Avail Cap(c_a), veh/h	1202	1018	312	1202	1126	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.4	9.2	16.5	6.6	11.7	0.0
Incr Delay (d2), s/veh	1.3	0.4	5.2	0.6	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.7	0.2	1.6	2.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.7	9.6	21.7	7.2	14.4	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	524			496	353	
Approach Delay, s/veh	11.1			7.6	14.4	
Approach LOS	B			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		13.7	5.5	15.1		20.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 22	* 6	* 22		* 22
Max Q Clear Time (g_c+I1), s		8.4	2.3	8.0		8.4
Green Ext Time (p_c), s		0.9	0.0	2.4		2.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			10.7			
HCM 6th LOS			B			

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



# MOVEMENT SUMMARY

 Site: 15 [SR 174 / Brunswick Road]

MITIG8 EPAP PM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: RoadName												
6	T1	260	3.0	0.442	7.4	LOS A	2.9	75.3	0.33	0.17	0.33	33.9
16	R2	285	3.0	0.442	7.4	LOS A	2.9	75.3	0.33	0.17	0.33	32.9
Approach		545	3.0	0.442	7.4	LOS A	2.9	75.3	0.33	0.17	0.33	33.4
North: RoadName												
7	L2	427	3.0	0.525	9.8	LOS A	3.6	91.3	0.61	0.50	0.63	30.9
14	R2	120	3.0	0.525	9.8	LOS A	3.6	91.3	0.61	0.50	0.63	30.1
Approach		547	3.0	0.525	9.8	LOS A	3.6	91.3	0.61	0.50	0.63	30.7
West: RoadName												
5	L2	80	3.0	0.381	8.7	LOS A	1.9	48.7	0.62	0.58	0.62	32.7
2	T1	246	3.0	0.381	8.7	LOS A	1.9	48.7	0.62	0.58	0.62	32.7
Approach		326	3.0	0.381	8.7	LOS A	1.9	48.7	0.62	0.58	0.62	32.7
All Vehicles		1417	3.0	0.525	8.7	LOS A	3.6	91.3	0.50	0.39	0.51	32.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

## 12: Brunswick Rd &amp; Idaho Maryland Rd



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	213	29	52	202	540	91	451	14
v/c Ratio	0.36	0.14	0.15	0.66	0.65	0.49	0.73	0.02
Control Delay	1.7	29.5	0.9	40.0	19.4	40.4	26.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	29.5	0.9	40.0	19.4	40.4	26.1	0.1
Queue Length 50th (ft)	0	11	0	76	175	35	155	0
Queue Length 95th (ft)	0	34	0	#194	295	#101	260	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	669	311	429	311	972	187	852	818
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.09	0.12	0.65	0.56	0.49	0.53	0.02

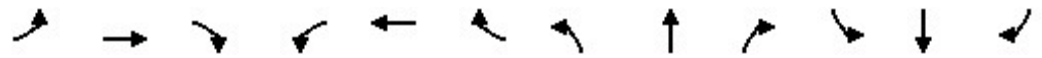
## Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP 1530  
 01/07/2020



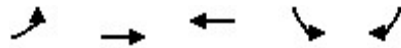
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	200	27	0	49	190	458	50	86	424	13
Future Volume (veh/h)	0	0	200	27	0	49	190	458	50	86	424	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	213	29	0	52	202	487	53	91	451	14
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	252	130	0	116	248	600	65	117	539	457
Arrive On Green	0.00	0.00	0.16	0.07	0.00	0.07	0.14	0.36	0.36	0.07	0.29	0.29
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1658	180	1781	1870	1585
Grp Volume(v), veh/h	0	0	213	29	0	52	202	0	540	91	451	14
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1838	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	8.0	0.9	0.0	1.9	6.8	0.0	16.4	3.1	13.9	0.4
Cycle Q Clear(g_c), s	0.0	0.0	8.0	0.9	0.0	1.9	6.8	0.0	16.4	3.1	13.9	0.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	252	130	0	116	248	0	665	117	539	457
V/C Ratio(X)	0.00	0.00	0.85	0.22	0.00	0.45	0.82	0.00	0.81	0.78	0.84	0.03
Avail Cap(c_a), veh/h	0	0	257	289	0	257	289	0	775	173	789	669
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	25.2	26.9	0.0	27.4	25.8	0.0	17.8	28.4	20.6	15.7
Incr Delay (d2), s/veh	0.0	0.0	21.9	0.9	0.0	2.7	14.4	0.0	5.7	12.4	5.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.4	0.4	0.0	0.8	3.5	0.0	6.7	1.6	5.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	47.0	27.8	0.0	30.1	40.2	0.0	23.5	40.7	25.8	15.8
LnGrp LOS	A	A	D	C	A	C	D	A	C	D	C	B
Approach Vol, veh/h		213			81			742			556	
Approach Delay, s/veh		47.0			29.3			28.0			28.0	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	28.0		14.9	13.7	23.5		9.6				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	6.0	26.0		10.0	10.0	26.0		10.0				
Max Q Clear Time (g_c+I1), s	5.1	18.4		10.0	8.8	15.9		3.9				
Green Ext Time (p_c), s	0.0	1.9		0.0	0.1	1.8		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			30.6									
HCM 6th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.

Queues  
15: SR 174 & Brunswick Rd



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	88	225	507	364	115
v/c Ratio	0.48	0.26	0.79	0.69	0.21
Control Delay	39.1	9.5	24.0	25.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	9.5	24.0	25.8	5.0
Queue Length 50th (ft)	30	40	114	112	0
Queue Length 95th (ft)	#95	83	#273	202	30
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	183	1185	836	740	729
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.48	0.19	0.61	0.49	0.16

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 15: SR 174 & Brunswick Rd

MITIG8 EPAP 1530  
 01/07/2020



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	80	205	186	276	331	105	
Future Volume (veh/h)	80	205	186	276	331	105	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	88	225	204	0	364	115	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	142	793	392		479	426	
Arrive On Green	0.08	0.42	0.21	0.00	0.27	0.27	
Sat Flow, veh/h	1781	1870	1870	0	1781	1585	
Grp Volume(v), veh/h	88	225	204	0	364	115	
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585	
Q Serve(g_s), s	1.8	3.0	3.7	0.0	7.1	2.2	
Cycle Q Clear(g_c), s	1.8	3.0	3.7	0.0	7.1	2.2	
Prop In Lane	1.00			0.00	1.00	1.00	
Lane Grp Cap(c), veh/h	142	793	392		479	426	
V/C Ratio(X)	0.62	0.28	0.52		0.76	0.27	
Avail Cap(c_a), veh/h	236	1069	1069		952	847	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	16.8	7.1	13.3	0.0	12.7	10.9	
Incr Delay (d2), s/veh	4.3	0.2	1.1	0.0	2.5	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.7	0.7	1.2	0.0	2.1	2.1	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	21.2	7.3	14.3	0.0	15.2	11.2	
LnGrp LOS	C	A	B		B	B	
Approach Vol, veh/h		313	204	A	479		
Approach Delay, s/veh		11.2	14.3		14.2		
Approach LOS		B	B		B		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				21.1	16.7	8.1	13.0
Change Period (Y+Rc), s				5.1	6.5	5.1	5.1
Max Green Setting (Gmax), s				21.6	20.2	5.0	21.6
Max Q Clear Time (g_c+I1), s				5.0	9.1	3.8	5.7
Green Ext Time (p_c), s				1.0	1.1	0.0	0.8
<b>Intersection Summary</b>							
HCM 6th Ctrl Delay			13.3				
HCM 6th LOS			B				
<b>Notes</b>							
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.							

## 19: Centennial Dr &amp; Idaho Maryland Rd



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	374	150	15	481	352
v/c Ratio	0.52	0.21	0.05	0.62	0.59
Control Delay	14.6	3.8	22.3	13.6	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	3.8	22.3	13.6	17.2
Queue Length 50th (ft)	56	0	3	77	57
Queue Length 95th (ft)	167	24	19	157	154
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1078	979	279	1513	1019
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.15	0.05	0.32	0.35

## Intersection Summary

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	299	120	12	385	245	37
Future Volume (veh/h)	299	120	12	385	245	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	374	150	15	481	306	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	566	480	42	866	399	60
Arrive On Green	0.30	0.30	0.02	0.46	0.26	0.26
Sat Flow, veh/h	1870	1585	1781	1870	1520	228
Grp Volume(v), veh/h	374	150	15	481	353	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1753	0
Q Serve(g_s), s	6.0	2.5	0.3	6.4	6.4	0.0
Cycle Q Clear(g_c), s	6.0	2.5	0.3	6.4	6.4	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	566	480	42	866	460	0
V/C Ratio(X)	0.66	0.31	0.36	0.56	0.77	0.00
Avail Cap(c_a), veh/h	1202	1018	312	1202	1126	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.4	9.2	16.5	6.6	11.7	0.0
Incr Delay (d2), s/veh	1.3	0.4	5.2	0.6	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.7	0.2	1.6	2.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.7	9.6	21.7	7.2	14.4	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	524			496	353	
Approach Delay, s/veh	11.1			7.6	14.4	
Approach LOS	B			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		13.7	5.5	15.1		20.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 22	* 6	* 22		* 22
Max Q Clear Time (g_c+I1), s		8.4	2.3	8.0		8.4
Green Ext Time (p_c), s		0.9	0.0	2.4		2.6
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			10.7			
HCM 6th LOS			B			

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



# MOVEMENT SUMMARY

 Site: 15 [SR 174 / Brunswick Road]

MITIG8 EPAP 1530 PM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: RoadName												
6	T1	202	3.0	0.411	7.0	LOS A	2.6	66.5	0.32	0.17	0.32	34.1
16	R2	300	3.0	0.411	7.0	LOS A	2.6	66.5	0.32	0.17	0.32	33.1
Approach		502	3.0	0.411	7.0	LOS A	2.6	66.5	0.32	0.17	0.32	33.5
North: RoadName												
7	L2	360	3.0	0.428	7.8	LOS A	2.5	65.2	0.49	0.35	0.49	31.8
14	R2	114	3.0	0.428	7.8	LOS A	2.5	65.2	0.49	0.35	0.49	30.9
Approach		474	3.0	0.428	7.8	LOS A	2.5	65.2	0.49	0.35	0.49	31.6
West: RoadName												
5	L2	87	3.0	0.337	7.6	LOS A	1.7	42.9	0.56	0.49	0.56	33.2
2	T1	223	3.0	0.337	7.6	LOS A	1.7	42.9	0.56	0.49	0.56	33.1
Approach		310	3.0	0.337	7.6	LOS A	1.7	42.9	0.56	0.49	0.56	33.1
All Vehicles		1286	3.0	0.428	7.4	LOS A	2.6	66.5	0.44	0.31	0.44	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Tuesday, January 7, 2020 11:28:14 AM

Project: C:\Users\JDF\KDA\Reports\Nevada County\ldaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 14.1 EPAP 1530 PM.sip8

Queues  
12: Brunswick Rd & Idaho Maryland Rd



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	232	68	114	266	523	40	372	9
v/c Ratio	0.37	0.29	0.31	0.88	0.61	0.19	0.70	0.02
Control Delay	1.7	30.0	3.2	61.3	19.8	29.4	27.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	30.0	3.2	61.3	19.8	29.4	27.6	0.0
Queue Length 50th (ft)	0	24	0	101	120	14	125	0
Queue Length 95th (ft)	0	62	11	#268	#359	43	215	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	694	302	426	302	864	302	780	767
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.23	0.27	0.88	0.61	0.13	0.48	0.01

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP plus Project AM Peak  
 Centennial Site



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	218	64	0	107	250	473	19	38	350	8
Future Volume (veh/h)	0	0	218	64	0	107	250	473	19	38	350	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	232	68	0	114	266	503	20	40	372	9
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	252	179	0	160	283	648	26	71	456	386
Arrive On Green	0.00	0.00	0.16	0.10	0.00	0.10	0.16	0.36	0.36	0.04	0.24	0.24
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1787	71	1781	1870	1585
Grp Volume(v), veh/h	0	0	232	68	0	114	266	0	523	40	372	9
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1858	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	9.0	2.2	0.0	4.3	9.2	0.0	15.5	1.4	11.7	0.3
Cycle Q Clear(g_c), s	0.0	0.0	9.0	2.2	0.0	4.3	9.2	0.0	15.5	1.4	11.7	0.3
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	252	179	0	160	283	0	674	71	456	386
V/C Ratio(X)	0.00	0.00	0.92	0.38	0.00	0.71	0.94	0.00	0.78	0.56	0.82	0.02
Avail Cap(c_a), veh/h	0	0	252	283	0	252	283	0	725	283	730	619
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	25.8	26.2	0.0	27.1	25.9	0.0	17.6	29.3	22.2	17.9
Incr Delay (d2), s/veh	0.0	0.0	35.9	1.3	0.0	5.8	37.3	0.0	5.0	6.7	3.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.7	1.0	0.0	1.8	6.4	0.0	6.4	0.7	4.9	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	61.7	27.5	0.0	32.9	63.2	0.0	22.6	36.0	26.1	17.9
LnGrp LOS	A	A	E	C	A	C	E	A	C	D	C	B
Approach Vol, veh/h		232			182			789			421	
Approach Delay, s/veh		61.7			30.9			36.3			26.9	
Approach LOS		E			C			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	28.3		15.0	15.0	20.9		11.4				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9.9	24.3		9.9	9.9	24.3		9.9				
Max Q Clear Time (g_c+I1), s	3.4	17.5		11.0	11.2	13.7		6.3				
Green Ext Time (p_c), s	0.0	1.7		0.0	0.0	1.5		0.2				

Intersection Summary

HCM 6th Ctrl Delay	36.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Queues  
14: E. Bennett Rd/Brunswick Rd



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	95	287	30	585	66	333
v/c Ratio	0.30	0.56	0.14	0.70	0.26	0.36
Control Delay	17.9	14.9	28.6	18.2	28.2	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	14.9	28.6	18.2	28.2	10.6
Queue Length 50th (ft)	18	38	9	146	19	40
Queue Length 95th (ft)	60	115	37	288	63	142
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	617	883	214	1478	257	1491
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.33	0.14	0.40	0.26	0.22

Intersection Summary

HCM 6th Signalized Intersection Summary  
 14: E. Bennett Rd/Brunswick Rd

MITIG8 EPAP plus Project AM Peak  
 Centennial Site



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	41	23	24	28	57	182	28	531	13	61	283	27
Future Volume (veh/h)	41	23	24	28	57	182	28	531	13	61	283	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	44	25	26	30	61	196	30	571	14	66	304	29
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	232	132	96	104	96	254	61	705	17	130	719	69
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.03	0.37	0.37	0.07	0.41	0.41
Sat Flow, veh/h	564	603	439	100	438	1160	1781	1890	46	1781	1748	167
Grp Volume(v), veh/h	95	0	0	287	0	0	30	0	585	66	0	333
Grp Sat Flow(s),veh/h/ln	1605	0	0	1698	0	0	1781	0	1937	1781	0	1915
Q Serve(g_s), s	0.0	0.0	0.0	3.1	0.0	0.0	0.8	0.0	13.2	1.7	0.0	6.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	7.7	0.0	0.0	0.8	0.0	13.2	1.7	0.0	6.0
Prop In Lane	0.46		0.27	0.10		0.68	1.00		0.02	1.00		0.09
Lane Grp Cap(c), veh/h	460	0	0	454	0	0	61	0	722	130	0	788
V/C Ratio(X)	0.21	0.00	0.00	0.63	0.00	0.00	0.49	0.00	0.81	0.51	0.00	0.42
Avail Cap(c_a), veh/h	677	0	0	707	0	0	183	0	1195	220	0	788
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.6	0.0	0.0	17.8	0.0	0.0	23.1	0.0	13.7	21.7	0.0	10.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.5	0.0	0.0	6.0	0.0	2.2	3.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	2.7	0.0	0.0	0.4	0.0	4.4	0.7	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	0.0	0.0	19.2	0.0	0.0	29.1	0.0	15.9	24.8	0.0	10.6
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		95			287			615				399
Approach Delay, s/veh		15.8			19.2			16.6				12.9
Approach LOS		B			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	24.6		15.4	6.8	26.5		15.4				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+l1), s	3.7	15.2		4.1	2.8	8.0		9.7				
Green Ext Time (p_c), s	0.0	2.9		0.4	0.0	1.2		1.0				

Intersection Summary

HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	303	935	188	276
v/c Ratio	0.68	0.74	0.56	0.53
Control Delay	31.7	25.7	33.2	7.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.7	25.7	33.2	7.7
Queue Length 50th (ft)	111	171	72	0
Queue Length 95th (ft)	209	#358	148	59
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	701	1347	676	775
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.43	0.69	0.28	0.36

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

MITIG8 EPAP plus Project PM Peak  
Centennial Site



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔↔	↔	↔
Traffic Volume (veh/h)	220	53	66	776	169	248
Future Volume (veh/h)	220	53	66	776	169	248
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	244	59	73	862	188	276
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	311	75	92	1136	389	346
Arrive On Green	0.21	0.21	0.34	0.34	0.22	0.22
Sat Flow, veh/h	1455	352	271	3456	1781	1585
Grp Volume(v), veh/h	0	303	500	435	188	276
Grp Sat Flow(s),veh/h/ln	0	1807	1857	1777	1781	1585
Q Serve(g_s), s	0.0	9.7	15.0	13.2	5.7	10.1
Cycle Q Clear(g_c), s	0.0	9.7	15.0	13.2	5.7	10.1
Prop In Lane		0.19	0.15		1.00	1.00
Lane Grp Cap(c), veh/h	0	386	627	600	389	346
V/C Ratio(X)	0.00	0.78	0.80	0.73	0.48	0.80
Avail Cap(c_a), veh/h	0	745	766	733	735	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	22.8	18.4	17.8	20.9	22.7
Incr Delay (d2), s/veh	0.0	3.5	4.9	2.8	0.9	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	6.6	5.3	2.3	3.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	26.3	23.3	20.6	21.9	26.9
LnGrp LOS	A	C	C	C	C	C
Approach Vol, veh/h	303			935	464	
Approach Delay, s/veh	26.3			22.0	24.9	
Approach LOS	C			C	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		18.1		17.8		25.4
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+I1), s		12.1		11.7		17.0
Green Ext Time (p_c), s		1.3		1.5		3.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			23.6			
HCM 6th LOS			C			
<b>Notes</b>						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Queues  
12: Brunswick Rd & Idaho Maryland Rd



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	247	26	78	308	573	97	491	14
v/c Ratio	0.42	0.14	0.24	0.94	0.70	0.45	0.79	0.02
Control Delay	2.2	31.8	1.8	69.6	23.1	36.8	30.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.2	31.8	1.8	69.6	23.1	36.8	30.4	0.1
Queue Length 50th (ft)	0	11	0	~140	207	39	183	0
Queue Length 95th (ft)	0	33	0	#310	#352	88	300	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	660	273	393	329	873	246	794	771
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.10	0.20	0.94	0.66	0.39	0.62	0.02

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP plus Project PM Peak  
 Centennial Site



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	240	25	0	76	299	499	57	94	476	14
Future Volume (veh/h)	0	0	240	25	0	76	299	499	57	94	476	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	247	26	0	78	308	514	59	97	491	14
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	228	134	0	119	308	668	77	125	567	481
Arrive On Green	0.00	0.00	0.14	0.08	0.00	0.08	0.17	0.41	0.41	0.07	0.30	0.30
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1647	189	1781	1870	1585
Grp Volume(v), veh/h	0	0	247	26	0	78	308	0	573	97	491	14
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1836	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	9.9	0.9	0.0	3.3	11.9	0.0	18.6	3.7	17.1	0.4
Cycle Q Clear(g_c), s	0.0	0.0	9.9	0.9	0.0	3.3	11.9	0.0	18.6	3.7	17.1	0.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	228	134	0	119	308	0	745	125	567	481
V/C Ratio(X)	0.00	0.00	1.08	0.19	0.00	0.65	1.00	0.00	0.77	0.77	0.87	0.03
Avail Cap(c_a), veh/h	0	0	228	256	0	228	308	0	781	230	742	628
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	29.5	29.9	0.0	31.0	28.5	0.0	17.7	31.5	22.7	16.9
Incr Delay (d2), s/veh	0.0	0.0	83.7	0.7	0.0	5.9	51.4	0.0	4.5	9.7	8.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	8.9	0.4	0.0	1.4	9.0	0.0	7.4	1.8	7.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	113.2	30.6	0.0	36.9	79.9	0.0	22.2	41.2	31.1	16.9
LnGrp LOS	A	A	F	C	A	D	F	A	C	D	C	B
Approach Vol, veh/h		247			104			881			602	
Approach Delay, s/veh		113.2			35.3			42.3			32.4	
Approach LOS		F			D			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	33.6		15.0	17.0	26.6		10.3				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	8.9	29.3		9.9	11.9	27.3		9.9				
Max Q Clear Time (g_c+I1), s	5.7	20.6		11.9	13.9	19.1		5.3				
Green Ext Time (p_c), s	0.1	2.2		0.0	0.0	1.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay	48.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Queues  
14: E. Bennett Rd/Brunswick Rd



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	86	155	21	433	155	589
v/c Ratio	0.25	0.38	0.09	0.62	0.58	0.45
Control Delay	15.1	12.4	22.1	16.6	33.9	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	12.4	22.1	16.6	33.9	9.0
Queue Length 50th (ft)	13	15	5	87	37	70
Queue Length 95th (ft)	47	60	24	173	#137	246
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	805	869	223	1513	268	1555
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.18	0.09	0.29	0.58	0.38

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 14: E. Bennett Rd/Brunswick Rd

MITIG8 EPAP plus Project PM Peak  
 Centennial Site



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	30	29	27	25	44	85	21	393	36	153	550	33
Future Volume (veh/h)	30	29	27	25	44	85	21	393	36	153	550	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	30	29	27	25	44	86	21	397	36	155	556	33
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	112	79	134	83	135	46	546	50	224	746	44
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.03	0.31	0.31	0.13	0.41	0.41
Sat Flow, veh/h	424	782	552	182	577	946	1781	1757	159	1781	1818	108
Grp Volume(v), veh/h	86	0	0	155	0	0	21	0	433	155	0	589
Grp Sat Flow(s),veh/h/ln	1758	0	0	1704	0	0	1781	0	1916	1781	0	1926
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.5	0.0	7.8	3.2	0.0	10.1
Cycle Q Clear(g_c), s	1.6	0.0	0.0	3.3	0.0	0.0	0.5	0.0	7.8	3.2	0.0	10.1
Prop In Lane	0.35		0.31	0.16		0.55	1.00		0.08	1.00		0.06
Lane Grp Cap(c), veh/h	377	0	0	352	0	0	46	0	595	224	0	790
V/C Ratio(X)	0.23	0.00	0.00	0.44	0.00	0.00	0.45	0.00	0.73	0.69	0.00	0.75
Avail Cap(c_a), veh/h	887	0	0	889	0	0	230	0	1483	276	0	894
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	0.0	15.6	0.0	0.0	18.6	0.0	11.9	16.2	0.0	9.7
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.9	0.0	0.0	6.7	0.0	1.7	5.5	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	1.1	0.0	0.0	0.2	0.0	2.3	1.3	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.2	0.0	0.0	16.5	0.0	0.0	25.3	0.0	13.6	21.7	0.0	12.7
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		86			155			454			744	
Approach Delay, s/veh		15.2			16.5			14.2			14.6	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	18.5		10.3	6.1	22.4		10.3				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+I1), s	5.2	9.8		3.6	2.5	12.1		5.3				
Green Ext Time (p_c), s	0.0	2.2		0.3	0.0	1.7		0.6				

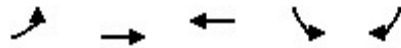
Intersection Summary

HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues  
15: SR 174 & Brunswick Rd



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	85	246	557	445	126
v/c Ratio	0.56	0.28	0.86	0.76	0.21
Control Delay	47.5	12.3	35.9	27.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	12.3	35.9	27.1	4.0
Queue Length 50th (ft)	32	51	171	148	0
Queue Length 95th (ft)	#105	121	#428	238	28
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	151	961	645	910	875
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.56	0.26	0.86	0.49	0.14

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 15: SR 174 & Brunswick Rd

MITIG8 EPAP plus Project PM Peak  
 Centennial Site



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	78	226	239	273	409	116	
Future Volume (veh/h)	78	226	239	273	409	116	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	85	246	260	0	445	126	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	135	751	377		563	501	
Arrive On Green	0.08	0.40	0.20	0.00	0.32	0.32	
Sat Flow, veh/h	1781	1870	1870	0	1781	1585	
Grp Volume(v), veh/h	85	246	260	0	445	126	
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585	
Q Serve(g_s), s	1.9	3.7	5.3	0.0	9.4	2.4	
Cycle Q Clear(g_c), s	1.9	3.7	5.3	0.0	9.4	2.4	
Prop In Lane	1.00			0.00	1.00	1.00	
Lane Grp Cap(c), veh/h	135	751	377		563	501	
V/C Ratio(X)	0.63	0.33	0.69		0.79	0.25	
Avail Cap(c_a), veh/h	217	911	911		1301	1158	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	18.4	8.5	15.2	0.0	12.8	10.4	
Incr Delay (d2), s/veh	4.8	0.3	2.3	0.0	2.5	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.8	1.0	1.9	0.0	2.8	2.5	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	23.2	8.7	17.5	0.0	15.3	10.7	
LnGrp LOS	C	A	B		B	B	
Approach Vol, veh/h		331	260	A	571		
Approach Delay, s/veh		12.4	17.5		14.3		
Approach LOS		B	B		B		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				21.6	19.5	8.2	13.4
Change Period (Y+Rc), s				5.1	6.5	5.1	5.1
Max Green Setting (Gmax), s				20.0	30.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				5.7	11.4	3.9	7.3
Green Ext Time (p_c), s				1.0	1.6	0.0	1.0

Intersection Summary

HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Queues  
19: Centennial Dr & Idaho Maryland Rd



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	411	150	15	531	352
v/c Ratio	0.55	0.21	0.06	0.66	0.60
Control Delay	14.9	3.7	22.8	14.3	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	3.7	22.8	14.3	18.0
Queue Length 50th (ft)	63	0	3	88	62
Queue Length 95th (ft)	185	24	19	177	154
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1045	953	271	1480	988
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.39	0.16	0.06	0.36	0.36
<b>Intersection Summary</b>					

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	329	120	12	425	245	37
Future Volume (veh/h)	329	120	12	425	245	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	411	150	15	531	306	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	598	507	41	889	396	60
Arrive On Green	0.32	0.32	0.02	0.48	0.26	0.26
Sat Flow, veh/h	1870	1585	1781	1870	1520	228
Grp Volume(v), veh/h	411	150	15	531	353	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1753	0
Q Serve(g_s), s	6.8	2.5	0.3	7.4	6.6	0.0
Cycle Q Clear(g_c), s	6.8	2.5	0.3	7.4	6.6	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	598	507	41	889	457	0
V/C Ratio(X)	0.69	0.30	0.36	0.60	0.77	0.00
Avail Cap(c_a), veh/h	1157	980	300	1157	1084	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.5	9.1	17.1	6.8	12.2	0.0
Incr Delay (d2), s/veh	1.4	0.3	5.2	0.6	2.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.7	0.2	1.9	2.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.0	9.4	22.4	7.5	15.0	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	561			546	353	
Approach Delay, s/veh	11.3			7.9	15.0	
Approach LOS	B			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		14.0	5.5	16.1		21.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 22	* 6	* 22		* 22
Max Q Clear Time (g_c+I1), s		8.6	2.3	8.8		9.4
Green Ext Time (p_c), s		0.9	0.0	2.6		2.8

Intersection Summary

HCM 6th Ctrl Delay	10.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



# MOVEMENT SUMMARY

 Site: 15 [SR 174 / Brunswick Road]

MITIG8 EPAP + Project PM  
 Centennial Site  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: RoadName												
6	T1	260	3.0	0.454	7.6	LOS A	3.1	78.4	0.34	0.18	0.34	33.8
16	R2	297	3.0	0.454	7.6	LOS A	3.1	78.4	0.34	0.18	0.34	32.8
Approach		557	3.0	0.454	7.6	LOS A	3.1	78.4	0.34	0.18	0.34	33.3
North: RoadName												
7	L2	445	3.0	0.548	10.3	LOS B	4.2	107.7	0.62	0.54	0.69	30.7
14	R2	126	3.0	0.548	10.3	LOS B	4.2	107.7	0.62	0.54	0.69	29.9
Approach		571	3.0	0.548	10.3	LOS B	4.2	107.7	0.62	0.54	0.69	30.5
West: RoadName												
5	L2	85	3.0	0.393	9.0	LOS A	2.0	51.8	0.63	0.61	0.66	32.6
2	T1	246	3.0	0.393	9.0	LOS A	2.0	51.8	0.63	0.61	0.66	32.5
Approach		330	3.0	0.393	9.0	LOS A	2.0	51.8	0.63	0.61	0.66	32.5
All Vehicles		1458	3.0	0.548	9.0	LOS A	4.2	107.7	0.52	0.42	0.55	32.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Tuesday, January 7, 2020 11:54:08 AM

Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 17.1 EPAPPP PM.sip8



Queues  
12: Brunswick Rd & Idaho Maryland Rd



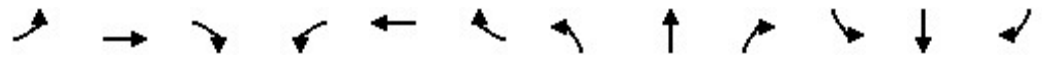
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	213	29	52	224	553	91	453	14
v/c Ratio	0.36	0.14	0.15	0.72	0.66	0.49	0.73	0.02
Control Delay	1.7	29.6	0.9	44.4	19.7	40.7	26.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	29.6	0.9	44.4	19.7	40.7	26.1	0.1
Queue Length 50th (ft)	0	11	0	86	181	35	156	0
Queue Length 95th (ft)	0	34	0	#220	304	#101	262	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	668	309	428	309	968	185	847	815
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.09	0.12	0.72	0.57	0.49	0.53	0.02

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP plus Project 1530  
 Centennial Site



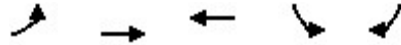
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	200	27	0	49	211	470	50	86	426	13
Future Volume (veh/h)	0	0	200	27	0	49	211	470	50	86	426	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	213	29	0	52	224	500	53	91	453	14
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	250	128	0	114	269	620	66	117	538	456
Arrive On Green	0.00	0.00	0.16	0.07	0.00	0.07	0.15	0.37	0.37	0.07	0.29	0.29
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1662	176	1781	1870	1585
Grp Volume(v), veh/h	0	0	213	29	0	52	224	0	553	91	453	14
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1839	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	8.3	1.0	0.0	2.0	7.7	0.0	17.1	3.2	14.4	0.4
Cycle Q Clear(g_c), s	0.0	0.0	8.3	1.0	0.0	2.0	7.7	0.0	17.1	3.2	14.4	0.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	250	128	0	114	269	0	686	117	538	456
V/C Ratio(X)	0.00	0.00	0.85	0.23	0.00	0.46	0.83	0.00	0.81	0.78	0.84	0.03
Avail Cap(c_a), veh/h	0	0	250	281	0	250	281	0	755	169	768	651
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	25.9	27.7	0.0	28.2	26.1	0.0	17.8	29.1	21.2	16.2
Incr Delay (d2), s/veh	0.0	0.0	23.3	0.9	0.0	2.8	18.3	0.0	5.9	13.3	5.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.6	0.4	0.0	0.8	4.3	0.0	7.0	1.7	6.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	49.3	28.6	0.0	31.0	44.4	0.0	23.7	42.5	27.1	16.2
LnGrp LOS	A	A	D	C	A	C	D	A	C	D	C	B
Approach Vol, veh/h		213			81			777			558	
Approach Delay, s/veh		49.3			30.2			29.7			29.3	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.2	29.3		15.1	14.7	23.9		9.7				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	6.0	26.0		10.0	10.0	26.0		10.0				
Max Q Clear Time (g_c+I1), s	5.2	19.1		10.3	9.7	16.4		4.0				
Green Ext Time (p_c), s	0.0	1.8		0.0	0.0	1.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay	32.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	89	225	507	370	119
v/c Ratio	0.49	0.26	0.79	0.70	0.21
Control Delay	39.5	9.6	24.0	26.1	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	9.6	24.0	26.1	4.9
Queue Length 50th (ft)	31	41	116	114	0
Queue Length 95th (ft)	#95	83	#273	205	31
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	182	1183	833	738	729
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.19	0.61	0.50	0.16

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 15: SR 174 & Brunswick Rd

MITIG8 EPAP plus Project 1530  
 Centennial Site



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	81	205	186	276	337	108	
Future Volume (veh/h)	81	205	186	276	337	108	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	89	225	204	0	370	119	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	143	790	389		485	432	
Arrive On Green	0.08	0.42	0.21	0.00	0.27	0.27	
Sat Flow, veh/h	1781	1870	1870	0	1781	1585	
Grp Volume(v), veh/h	89	225	204	0	370	119	
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585	
Q Serve(g_s), s	1.8	3.0	3.7	0.0	7.3	2.2	
Cycle Q Clear(g_c), s	1.8	3.0	3.7	0.0	7.3	2.2	
Prop In Lane	1.00			0.00	1.00	1.00	
Lane Grp Cap(c), veh/h	143	790	389		485	432	
V/C Ratio(X)	0.62	0.28	0.52		0.76	0.28	
Avail Cap(c_a), veh/h	234	1063	1063		947	842	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(l)	1.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	16.9	7.2	13.4	0.0	12.7	10.9	
Incr Delay (d2), s/veh	4.4	0.2	1.1	0.0	2.5	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.7	0.7	1.2	0.0	2.1	0.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	21.3	7.4	14.5	0.0	15.2	11.2	
LnGrp LOS	C	A	B		B	B	
Approach Vol, veh/h		314	204	A	489		
Approach Delay, s/veh		11.3	14.5		14.3		
Approach LOS		B	B		B		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				21.2	16.8	8.1	13.0
Change Period (Y+Rc), s				5.1	6.5	5.1	5.1
Max Green Setting (Gmax), s				21.6	20.2	5.0	21.6
Max Q Clear Time (g_c+I1), s				5.0	9.3	3.8	5.7
Green Ext Time (p_c), s				1.0	1.2	0.0	0.8

Intersection Summary

HCM 6th Ctrl Delay	13.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Queues  
19: Centennial Dr & Idaho Maryland Rd



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	379	150	15	500	352
v/c Ratio	0.52	0.21	0.05	0.63	0.60
Control Delay	14.5	3.7	22.5	13.8	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	3.7	22.5	13.8	17.5
Queue Length 50th (ft)	56	0	3	81	59
Queue Length 95th (ft)	169	24	19	165	154
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1065	969	276	1502	1007
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.15	0.05	0.33	0.35
<b>Intersection Summary</b>					

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	303	120	12	400	245	37
Future Volume (veh/h)	303	120	12	400	245	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	379	150	15	500	306	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	571	483	41	869	398	60
Arrive On Green	0.31	0.31	0.02	0.46	0.26	0.26
Sat Flow, veh/h	1870	1585	1781	1870	1520	228
Grp Volume(v), veh/h	379	150	15	500	353	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1753	0
Q Serve(g_s), s	6.1	2.5	0.3	6.7	6.4	0.0
Cycle Q Clear(g_c), s	6.1	2.5	0.3	6.7	6.4	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	571	483	41	869	459	0
V/C Ratio(X)	0.66	0.31	0.36	0.58	0.77	0.00
Avail Cap(c_a), veh/h	1195	1013	310	1195	1121	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.4	9.2	16.6	6.7	11.7	0.0
Incr Delay (d2), s/veh	1.3	0.4	5.2	0.6	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.7	0.2	1.7	2.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.8	9.5	21.8	7.3	14.5	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	529			515	353	
Approach Delay, s/veh	11.1			7.8	14.5	
Approach LOS	B			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		13.7	5.5	15.2		20.7
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 22	* 6	* 22		* 22
Max Q Clear Time (g_c+I1), s		8.4	2.3	8.1		8.7
Green Ext Time (p_c), s		0.9	0.0	2.4		2.7
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			10.7			
HCM 6th LOS			B			
<b>Notes</b>						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						



# MOVEMENT SUMMARY

 Site: 15 [SR 174 / Brunswick Road]

MITIG8 EPAP + Project 1530 PM  
 Centennial Site  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: RoadName												
6	T1	202	3.0	0.411	7.0	LOS A	2.6	66.5	0.33	0.17	0.33	34.1
16	R2	300	3.0	0.411	7.0	LOS A	2.6	66.5	0.33	0.17	0.33	33.1
Approach		502	3.0	0.411	7.0	LOS A	2.6	66.5	0.33	0.17	0.33	33.5
North: RoadName												
7	L2	366	3.0	0.436	7.9	LOS A	2.6	67.2	0.49	0.35	0.49	31.8
14	R2	117	3.0	0.436	7.9	LOS A	2.6	67.2	0.49	0.35	0.49	30.9
Approach		484	3.0	0.436	7.9	LOS A	2.6	67.2	0.49	0.35	0.49	31.6
West: RoadName												
5	L2	88	3.0	0.341	7.7	LOS A	1.7	43.3	0.57	0.50	0.57	33.1
2	T1	223	3.0	0.341	7.7	LOS A	1.7	43.3	0.57	0.50	0.57	33.1
Approach		311	3.0	0.341	7.7	LOS A	1.7	43.3	0.57	0.50	0.57	33.1
All Vehicles		1297	3.0	0.436	7.5	LOS A	2.6	67.2	0.45	0.32	0.45	32.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Tuesday, January 7, 2020 11:53:18 AM

Project: C:\Users\JDF\KDAI\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 19.1 EPAPPP 1530 PM.sip8



Queues  
12: Brunswick Rd & Idaho Maryland Rd



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	232	68	114	266	532	40	381	9
v/c Ratio	0.38	0.29	0.31	0.88	0.61	0.19	0.71	0.02
Control Delay	1.8	30.1	3.3	62.0	20.0	29.4	28.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.8	30.1	3.3	62.0	20.0	29.4	28.0	0.0
Queue Length 50th (ft)	0	24	0	102	123	14	129	0
Queue Length 95th (ft)	0	62	11	#268	#368	43	220	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	689	301	425	301	867	301	777	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.23	0.27	0.88	0.61	0.13	0.49	0.01

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP plus Project AM Peak  
 To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	218	64	0	107	250	481	19	38	358	8
Future Volume (veh/h)	0	0	218	64	0	107	250	481	19	38	358	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	232	68	0	114	266	512	20	40	381	9
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	251	179	0	159	282	654	26	71	464	393
Arrive On Green	0.00	0.00	0.16	0.10	0.00	0.10	0.16	0.37	0.37	0.04	0.25	0.25
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1788	70	1781	1870	1585
Grp Volume(v), veh/h	0	0	232	68	0	114	266	0	532	40	381	9
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1858	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	9.0	2.2	0.0	4.4	9.3	0.0	15.9	1.4	12.0	0.3
Cycle Q Clear(g_c), s	0.0	0.0	9.0	2.2	0.0	4.4	9.3	0.0	15.9	1.4	12.0	0.3
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	251	179	0	159	282	0	680	71	464	393
V/C Ratio(X)	0.00	0.00	0.93	0.38	0.00	0.72	0.94	0.00	0.78	0.56	0.82	0.02
Avail Cap(c_a), veh/h	0	0	251	282	0	251	282	0	721	282	726	615
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	26.0	26.3	0.0	27.3	26.1	0.0	17.6	29.5	22.2	17.8
Incr Delay (d2), s/veh	0.0	0.0	37.4	1.3	0.0	5.9	38.9	0.0	5.3	6.7	4.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	5.8	1.0	0.0	1.8	6.5	0.0	6.6	0.7	5.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	63.4	27.7	0.0	33.2	65.0	0.0	23.0	36.3	26.6	17.8
LnGrp LOS	A	A	E	C	A	C	E	A	C	D	C	B
Approach Vol, veh/h		232			182			798			430	
Approach Delay, s/veh		63.4			31.1			37.0			27.3	
Approach LOS		E			C			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.6	28.6		15.0	15.0	21.2		11.4				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	9.9	24.3		9.9	9.9	24.3		9.9				
Max Q Clear Time (g_c+I1), s	3.4	17.9		11.0	11.3	14.0		6.4				
Green Ext Time (p_c), s	0.0	1.6		0.0	0.0	1.5		0.2				

Intersection Summary

HCM 6th Ctrl Delay	37.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Queues  
14: E. Bennett Rd/Brunswick Rd



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	95	287	30	585	66	333
v/c Ratio	0.30	0.56	0.14	0.70	0.26	0.36
Control Delay	17.9	14.9	28.6	18.2	28.2	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	14.9	28.6	18.2	28.2	10.6
Queue Length 50th (ft)	18	38	9	146	19	40
Queue Length 95th (ft)	60	115	37	288	63	142
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	617	883	214	1478	257	1491
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.33	0.14	0.40	0.26	0.22
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 14: E. Bennett Rd/Brunswick Rd

MITIG8 EPAP plus Project AM Peak  
 To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	41	23	24	28	57	182	28	531	13	61	283	27
Future Volume (veh/h)	41	23	24	28	57	182	28	531	13	61	283	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	44	25	26	30	61	196	30	571	14	66	304	29
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	232	132	96	104	96	254	61	705	17	130	719	69
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.03	0.37	0.37	0.07	0.41	0.41
Sat Flow, veh/h	564	603	439	100	438	1160	1781	1890	46	1781	1748	167
Grp Volume(v), veh/h	95	0	0	287	0	0	30	0	585	66	0	333
Grp Sat Flow(s),veh/h/ln	1605	0	0	1698	0	0	1781	0	1937	1781	0	1915
Q Serve(g_s), s	0.0	0.0	0.0	3.1	0.0	0.0	0.8	0.0	13.2	1.7	0.0	6.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	7.7	0.0	0.0	0.8	0.0	13.2	1.7	0.0	6.0
Prop In Lane	0.46		0.27	0.10		0.68	1.00		0.02	1.00		0.09
Lane Grp Cap(c), veh/h	460	0	0	454	0	0	61	0	722	130	0	788
V/C Ratio(X)	0.21	0.00	0.00	0.63	0.00	0.00	0.49	0.00	0.81	0.51	0.00	0.42
Avail Cap(c_a), veh/h	677	0	0	707	0	0	183	0	1195	220	0	788
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.6	0.0	0.0	17.8	0.0	0.0	23.1	0.0	13.7	21.7	0.0	10.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.5	0.0	0.0	6.0	0.0	2.2	3.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.0	2.7	0.0	0.0	0.4	0.0	4.4	0.7	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	0.0	0.0	19.2	0.0	0.0	29.1	0.0	15.9	24.8	0.0	10.6
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		95			287			615				399
Approach Delay, s/veh		15.8			19.2			16.6				12.9
Approach LOS		B			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	24.6		15.4	6.8	26.5		15.4				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+l1), s	3.7	15.2		4.1	2.8	8.0		9.7				
Green Ext Time (p_c), s	0.0	2.9		0.4	0.0	1.2		1.0				

Intersection Summary

HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	303	935	188	276
v/c Ratio	0.68	0.74	0.56	0.53
Control Delay	31.7	25.7	33.2	7.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.7	25.7	33.2	7.7
Queue Length 50th (ft)	111	171	72	0
Queue Length 95th (ft)	209	#358	148	59
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	701	1347	676	775
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.43	0.69	0.28	0.36

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
6: SR 49 EB Ramps & Idaho Maryland Rd

MITIG8 EPAP plus Project PM Peak  
To SR 49



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩↩	↩	↩
Traffic Volume (veh/h)	220	53	66	776	169	248
Future Volume (veh/h)	220	53	66	776	169	248
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	244	59	73	862	188	276
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	311	75	92	1136	389	346
Arrive On Green	0.21	0.21	0.34	0.34	0.22	0.22
Sat Flow, veh/h	1455	352	271	3456	1781	1585
Grp Volume(v), veh/h	0	303	500	435	188	276
Grp Sat Flow(s),veh/h/ln	0	1807	1857	1777	1781	1585
Q Serve(g_s), s	0.0	9.7	15.0	13.2	5.7	10.1
Cycle Q Clear(g_c), s	0.0	9.7	15.0	13.2	5.7	10.1
Prop In Lane		0.19	0.15		1.00	1.00
Lane Grp Cap(c), veh/h	0	386	627	600	389	346
V/C Ratio(X)	0.00	0.78	0.80	0.73	0.48	0.80
Avail Cap(c_a), veh/h	0	745	766	733	735	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	22.8	18.4	17.8	20.9	22.7
Incr Delay (d2), s/veh	0.0	3.5	4.9	2.8	0.9	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.2	6.6	5.3	2.3	3.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	26.3	23.3	20.6	21.9	26.9
LnGrp LOS	A	C	C	C	C	C
Approach Vol, veh/h	303			935	464	
Approach Delay, s/veh	26.3			22.0	24.9	
Approach LOS	C			C	C	
Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		18.1		17.8		25.4
Change Period (Y+Rc), s		* 4.7		* 4.7		4.7
Max Green Setting (Gmax), s		* 25		* 25		25.3
Max Q Clear Time (g_c+I1), s		12.1		11.7		17.0
Green Ext Time (p_c), s		1.3		1.5		3.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			23.6			
HCM 6th LOS			C			
<b>Notes</b>						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Queues  
12: Brunswick Rd & Idaho Maryland Rd



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	247	26	78	308	582	97	499	14
v/c Ratio	0.42	0.14	0.24	0.94	0.71	0.45	0.79	0.02
Control Delay	2.2	31.9	1.8	70.7	23.4	37.0	30.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.2	31.9	1.8	70.7	23.4	37.0	30.8	0.1
Queue Length 50th (ft)	0	11	0	~148	212	40	187	0
Queue Length 95th (ft)	0	33	0	#310	#368	88	306	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	657	272	392	327	869	245	791	769
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.10	0.20	0.94	0.67	0.40	0.63	0.02

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.  
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



HCM 6th Signalized Intersection Summary  
12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP plus Project PM Peak  
To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	240	25	0	76	299	507	57	94	484	14
Future Volume (veh/h)	0	0	240	25	0	76	299	507	57	94	484	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	247	26	0	78	308	523	59	97	499	14
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	227	133	0	119	306	674	76	125	574	486
Arrive On Green	0.00	0.00	0.14	0.07	0.00	0.07	0.17	0.41	0.41	0.07	0.31	0.31
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1651	186	1781	1870	1585
Grp Volume(v), veh/h	0	0	247	26	0	78	308	0	582	97	499	14
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1837	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	9.9	0.9	0.0	3.3	11.9	0.0	19.0	3.7	17.5	0.4
Cycle Q Clear(g_c), s	0.0	0.0	9.9	0.9	0.0	3.3	11.9	0.0	19.0	3.7	17.5	0.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	227	133	0	119	306	0	750	125	574	486
V/C Ratio(X)	0.00	0.00	1.09	0.19	0.00	0.66	1.01	0.00	0.78	0.77	0.87	0.03
Avail Cap(c_a), veh/h	0	0	227	255	0	227	306	0	777	229	738	625
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	29.7	30.1	0.0	31.2	28.7	0.0	17.7	31.6	22.7	16.8
Incr Delay (d2), s/veh	0.0	0.0	85.7	0.7	0.0	6.0	52.9	0.0	4.8	9.7	8.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	9.0	0.4	0.0	1.4	9.1	0.0	7.6	1.8	8.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	115.4	30.8	0.0	37.2	81.6	0.0	22.5	41.4	31.6	16.8
LnGrp LOS	A	A	F	C	A	D	F	A	C	D	C	B
Approach Vol, veh/h		247			104			890			610	
Approach Delay, s/veh		115.4			35.6			43.0			32.8	
Approach LOS		F			D			D			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	34.0		15.0	17.0	26.9		10.3				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	8.9	29.3		9.9	11.9	27.3		9.9				
Max Q Clear Time (g_c+I1), s	5.7	21.0		11.9	13.9	19.5		5.3				
Green Ext Time (p_c), s	0.1	2.2		0.0	0.0	1.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay	48.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Queues  
14: E. Bennett Rd/Brunswick Rd



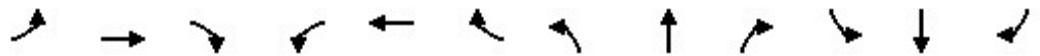
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	86	155	21	433	155	589
v/c Ratio	0.25	0.38	0.09	0.62	0.58	0.45
Control Delay	15.1	12.4	22.1	16.6	33.9	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	12.4	22.1	16.6	33.9	9.0
Queue Length 50th (ft)	13	15	5	87	37	70
Queue Length 95th (ft)	47	60	24	173	#137	246
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	805	869	223	1513	268	1555
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.18	0.09	0.29	0.58	0.38

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 14: E. Bennett Rd/Brunswick Rd

MITIG8 EPAP plus Project PM Peak  
 To SR 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	30	29	27	25	44	85	21	393	36	153	550	33
Future Volume (veh/h)	30	29	27	25	44	85	21	393	36	153	550	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	30	29	27	25	44	86	21	397	36	155	556	33
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	112	79	134	83	135	46	546	50	224	746	44
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.03	0.31	0.31	0.13	0.41	0.41
Sat Flow, veh/h	424	782	552	182	577	946	1781	1757	159	1781	1818	108
Grp Volume(v), veh/h	86	0	0	155	0	0	21	0	433	155	0	589
Grp Sat Flow(s),veh/h/ln	1758	0	0	1704	0	0	1781	0	1916	1781	0	1926
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.5	0.0	7.8	3.2	0.0	10.1
Cycle Q Clear(g_c), s	1.6	0.0	0.0	3.3	0.0	0.0	0.5	0.0	7.8	3.2	0.0	10.1
Prop In Lane	0.35		0.31	0.16		0.55	1.00		0.08	1.00		0.06
Lane Grp Cap(c), veh/h	377	0	0	352	0	0	46	0	595	224	0	790
V/C Ratio(X)	0.23	0.00	0.00	0.44	0.00	0.00	0.45	0.00	0.73	0.69	0.00	0.75
Avail Cap(c_a), veh/h	887	0	0	889	0	0	230	0	1483	276	0	894
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	0.0	15.6	0.0	0.0	18.6	0.0	11.9	16.2	0.0	9.7
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.9	0.0	0.0	6.7	0.0	1.7	5.5	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	1.1	0.0	0.0	0.2	0.0	2.3	1.3	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.2	0.0	0.0	16.5	0.0	0.0	25.3	0.0	13.6	21.7	0.0	12.7
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		86			155			454			744	
Approach Delay, s/veh		15.2			16.5			14.2			14.6	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	18.5		10.3	6.1	22.4		10.3				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+I1), s	5.2	9.8		3.6	2.5	12.1		5.3				
Green Ext Time (p_c), s	0.0	2.2		0.3	0.0	1.7		0.6				

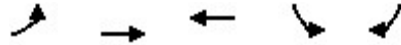
Intersection Summary

HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues  
15: SR 174 & Brunswick Rd



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	85	246	557	445	126
v/c Ratio	0.56	0.28	0.86	0.76	0.21
Control Delay	47.5	12.3	35.9	27.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	12.3	35.9	27.1	4.0
Queue Length 50th (ft)	32	51	171	148	0
Queue Length 95th (ft)	#105	121	#428	238	28
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	151	961	645	910	875
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.56	0.26	0.86	0.49	0.14

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
15: SR 174 & Brunswick Rd

MITIG8 EPAP plus Project PM Peak  
To SR 49



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	78	226	239	273	409	116	
Future Volume (veh/h)	78	226	239	273	409	116	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	85	246	260	0	445	126	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	135	751	377		563	501	
Arrive On Green	0.08	0.40	0.20	0.00	0.32	0.32	
Sat Flow, veh/h	1781	1870	1870	0	1781	1585	
Grp Volume(v), veh/h	85	246	260	0	445	126	
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585	
Q Serve(g_s), s	1.9	3.7	5.3	0.0	9.4	2.4	
Cycle Q Clear(g_c), s	1.9	3.7	5.3	0.0	9.4	2.4	
Prop In Lane	1.00			0.00	1.00	1.00	
Lane Grp Cap(c), veh/h	135	751	377		563	501	
V/C Ratio(X)	0.63	0.33	0.69		0.79	0.25	
Avail Cap(c_a), veh/h	217	911	911		1301	1158	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	18.4	8.5	15.2	0.0	12.8	10.4	
Incr Delay (d2), s/veh	4.8	0.3	2.3	0.0	2.5	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.8	1.0	1.9	0.0	2.8	2.5	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	23.2	8.7	17.5	0.0	15.3	10.7	
LnGrp LOS	C	A	B		B	B	
Approach Vol, veh/h		331	260	A	571		
Approach Delay, s/veh		12.4	17.5		14.3		
Approach LOS		B	B		B		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				21.6	19.5	8.2	13.4
Change Period (Y+Rc), s				5.1	6.5	5.1	5.1
Max Green Setting (Gmax), s				20.0	30.0	5.0	20.0
Max Q Clear Time (g_c+I1), s				5.7	11.4	3.9	7.3
Green Ext Time (p_c), s				1.0	1.6	0.0	1.0

Intersection Summary

HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Notes

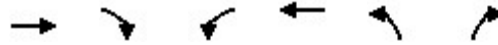
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Queues  
19: Centennial Dr & Idaho Maryland Rd



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	411	150	15	531	352
v/c Ratio	0.55	0.21	0.06	0.66	0.60
Control Delay	14.9	3.7	22.8	14.3	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	3.7	22.8	14.3	18.0
Queue Length 50th (ft)	63	0	3	88	62
Queue Length 95th (ft)	185	24	19	177	154
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1045	953	271	1480	988
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.39	0.16	0.06	0.36	0.36
<b>Intersection Summary</b>					

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	329	120	12	425	245	37
Future Volume (veh/h)	329	120	12	425	245	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	411	150	15	531	306	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	598	507	41	889	396	60
Arrive On Green	0.32	0.32	0.02	0.48	0.26	0.26
Sat Flow, veh/h	1870	1585	1781	1870	1520	228
Grp Volume(v), veh/h	411	150	15	531	353	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1753	0
Q Serve(g_s), s	6.8	2.5	0.3	7.4	6.6	0.0
Cycle Q Clear(g_c), s	6.8	2.5	0.3	7.4	6.6	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	598	507	41	889	457	0
V/C Ratio(X)	0.69	0.30	0.36	0.60	0.77	0.00
Avail Cap(c_a), veh/h	1157	980	300	1157	1084	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.5	9.1	17.1	6.8	12.2	0.0
Incr Delay (d2), s/veh	1.4	0.3	5.2	0.6	2.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.7	0.2	1.9	2.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.0	9.4	22.4	7.5	15.0	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	561			546	353	
Approach Delay, s/veh	11.3			7.9	15.0	
Approach LOS	B			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		14.0	5.5	16.1		21.6
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 22	* 6	* 22		* 22
Max Q Clear Time (g_c+I1), s		8.6	2.3	8.8		9.4
Green Ext Time (p_c), s		0.9	0.0	2.6		2.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			10.9			
HCM 6th LOS			B			
<b>Notes</b>						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						





Queues  
12: Brunswick Rd & Idaho Maryland Rd



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	213	29	52	224	562	91	462	14
v/c Ratio	0.37	0.14	0.15	0.73	0.67	0.49	0.74	0.02
Control Delay	1.8	29.7	0.9	45.0	19.8	41.1	26.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.8	29.7	0.9	45.0	19.8	41.1	26.2	0.1
Queue Length 50th (ft)	0	11	0	87	185	35	160	0
Queue Length 95th (ft)	0	34	0	#220	312	#101	268	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	663	307	426	307	961	184	841	810
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.09	0.12	0.73	0.58	0.49	0.55	0.02

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 12: Brunswick Rd & Idaho Maryland Rd

MITIG8 EPAP plus Project 1530  
 To SR 49



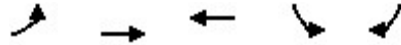
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔	↔	↔	↔		↔	↔	↔
Traffic Volume (veh/h)	0	0	200	27	0	49	211	478	50	86	434	13
Future Volume (veh/h)	0	0	200	27	0	49	211	478	50	86	434	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	0	213	29	0	52	224	509	53	91	462	14
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
Percent Heavy Veh, %	0	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	0	248	128	0	114	269	628	65	117	545	462
Arrive On Green	0.00	0.00	0.16	0.07	0.00	0.07	0.15	0.38	0.38	0.07	0.29	0.29
Sat Flow, veh/h	0	0	1585	1781	0	1585	1781	1666	173	1781	1870	1585
Grp Volume(v), veh/h	0	0	213	29	0	52	224	0	562	91	462	14
Grp Sat Flow(s),veh/h/ln	0	0	1585	1781	0	1585	1781	0	1839	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	8.4	1.0	0.0	2.0	7.8	0.0	17.5	3.2	14.8	0.4
Cycle Q Clear(g_c), s	0.0	0.0	8.4	1.0	0.0	2.0	7.8	0.0	17.5	3.2	14.8	0.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	0	0	248	128	0	114	269	0	693	117	545	462
V/C Ratio(X)	0.00	0.00	0.86	0.23	0.00	0.46	0.83	0.00	0.81	0.78	0.85	0.03
Avail Cap(c_a), veh/h	0	0	248	279	0	248	279	0	749	168	762	646
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	26.2	27.9	0.0	28.4	26.3	0.0	17.8	29.4	21.3	16.1
Incr Delay (d2), s/veh	0.0	0.0	24.5	0.9	0.0	2.9	18.6	0.0	6.3	13.6	6.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.7	0.4	0.0	0.8	4.3	0.0	7.3	1.7	6.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	50.7	28.8	0.0	31.3	44.9	0.0	24.1	43.0	27.6	16.2
LnGrp LOS	A	A	D	C	A	C	D	A	C	D	C	B
Approach Vol, veh/h		213			81			786			567	
Approach Delay, s/veh		50.7			30.4			30.0			29.8	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	29.7		15.1	14.7	24.3		9.7				
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s	6.0	26.0		10.0	10.0	26.0		10.0				
Max Q Clear Time (g_c+I1), s	5.2	19.5		10.4	9.8	16.8		4.0				
Green Ext Time (p_c), s	0.0	1.8		0.0	0.0	1.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay	32.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	89	225	507	370	119
v/c Ratio	0.49	0.26	0.79	0.70	0.21
Control Delay	39.5	9.6	24.0	26.1	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	9.6	24.0	26.1	4.9
Queue Length 50th (ft)	31	41	116	114	0
Queue Length 95th (ft)	#95	83	#273	205	31
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	182	1183	833	738	729
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.19	0.61	0.50	0.16

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 15: SR 174 & Brunswick Rd

MITIG8 EPAP plus Project 1530  
 To SR 49



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	81	205	186	276	337	108	
Future Volume (veh/h)	81	205	186	276	337	108	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	89	225	204	0	370	119	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	143	790	389		485	432	
Arrive On Green	0.08	0.42	0.21	0.00	0.27	0.27	
Sat Flow, veh/h	1781	1870	1870	0	1781	1585	
Grp Volume(v), veh/h	89	225	204	0	370	119	
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	0	1781	1585	
Q Serve(g_s), s	1.8	3.0	3.7	0.0	7.3	2.2	
Cycle Q Clear(g_c), s	1.8	3.0	3.7	0.0	7.3	2.2	
Prop In Lane	1.00			0.00	1.00	1.00	
Lane Grp Cap(c), veh/h	143	790	389		485	432	
V/C Ratio(X)	0.62	0.28	0.52		0.76	0.28	
Avail Cap(c_a), veh/h	234	1063	1063		947	842	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00	
Uniform Delay (d), s/veh	16.9	7.2	13.4	0.0	12.7	10.9	
Incr Delay (d2), s/veh	4.4	0.2	1.1	0.0	2.5	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	0.7	0.7	1.2	0.0	2.1	0.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	21.3	7.4	14.5	0.0	15.2	11.2	
LnGrp LOS	C	A	B		B	B	
Approach Vol, veh/h		314	204	A	489		
Approach Delay, s/veh		11.3	14.5		14.3		
Approach LOS		B	B		B		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				21.2	16.8	8.1	13.0
Change Period (Y+Rc), s				5.1	6.5	5.1	5.1
Max Green Setting (Gmax), s				21.6	20.2	5.0	21.6
Max Q Clear Time (g_c+I1), s				5.0	9.3	3.8	5.7
Green Ext Time (p_c), s				1.0	1.2	0.0	0.8

Intersection Summary

HCM 6th Ctrl Delay	13.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

## 19: Centennial Dr &amp; Idaho Maryland Rd



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	379	150	15	500	352
v/c Ratio	0.52	0.21	0.05	0.63	0.60
Control Delay	14.5	3.7	22.5	13.8	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	3.7	22.5	13.8	17.5
Queue Length 50th (ft)	56	0	3	81	59
Queue Length 95th (ft)	169	24	19	165	154
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1065	969	276	1502	1007
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.15	0.05	0.33	0.35

## Intersection Summary

HCM 6th Signalized Intersection Summary  
 19: Centennial Dr & Idaho Maryland Rd



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Traffic Volume (veh/h)	303	120	12	400	245	37
Future Volume (veh/h)	303	120	12	400	245	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1900	1900
Adj Flow Rate, veh/h	379	150	15	500	306	46
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	0	0
Cap, veh/h	571	483	41	869	398	60
Arrive On Green	0.31	0.31	0.02	0.46	0.26	0.26
Sat Flow, veh/h	1870	1585	1781	1870	1520	228
Grp Volume(v), veh/h	379	150	15	500	353	0
Grp Sat Flow(s),veh/h/ln	1870	1585	1781	1870	1753	0
Q Serve(g_s), s	6.1	2.5	0.3	6.7	6.4	0.0
Cycle Q Clear(g_c), s	6.1	2.5	0.3	6.7	6.4	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	571	483	41	869	459	0
V/C Ratio(X)	0.66	0.31	0.36	0.58	0.77	0.00
Avail Cap(c_a), veh/h	1195	1013	310	1195	1121	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.4	9.2	16.6	6.7	11.7	0.0
Incr Delay (d2), s/veh	1.3	0.4	5.2	0.6	2.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.7	0.2	1.7	2.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.8	9.5	21.8	7.3	14.5	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	529			515	353	
Approach Delay, s/veh	11.1			7.8	14.5	
Approach LOS	B			A	B	
Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		13.7	5.5	15.2		20.7
Change Period (Y+Rc), s		* 4.7	* 4.7	* 4.7		* 4.7
Max Green Setting (Gmax), s		* 22	* 6	* 22		* 22
Max Q Clear Time (g_c+I1), s		8.4	2.3	8.1		8.7
Green Ext Time (p_c), s		0.9	0.0	2.4		2.7
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			10.7			
HCM 6th LOS			B			
<b>Notes</b>						
User approved volume balancing among the lanes for turning movement.						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						



Queues  
14: E. Bennett Rd/Brunswick Rd

MITIG8 Cumulative AM Peak  
01/07/2020



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	90	274	20	565	56	249
v/c Ratio	0.35	0.53	0.09	0.68	0.21	0.25
Control Delay	21.6	12.9	27.2	17.1	26.6	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	12.9	27.2	17.1	26.6	7.7
Queue Length 50th (ft)	20	27	5	133	15	26
Queue Length 95th (ft)	64	98	27	263	55	99
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	542	916	220	1508	265	1530
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.30	0.09	0.37	0.21	0.16

Intersection Summary



HCM 6th Signalized Intersection Summary  
 14: E. Bennett Rd/Brunswick Rd

MITIG8 Cumulative AM Peak  
 01/07/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	48	22	13	25	48	181	19	513	12	52	203	29
Future Volume (veh/h)	48	22	13	25	48	181	19	513	12	52	203	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	52	24	14	27	52	195	20	552	13	56	218	31
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	278	122	51	105	85	258	44	694	16	119	680	97
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.02	0.37	0.37	0.07	0.41	0.41
Sat Flow, veh/h	726	567	238	92	397	1206	1781	1893	45	1781	1666	237
Grp Volume(v), veh/h	90	0	0	274	0	0	20	0	565	56	0	249
Grp Sat Flow(s),veh/h/ln	1531	0	0	1694	0	0	1781	0	1937	1781	0	1903
Q Serve(g_s), s	0.0	0.0	0.0	2.6	0.0	0.0	0.5	0.0	12.1	1.4	0.0	4.1
Cycle Q Clear(g_c), s	1.9	0.0	0.0	7.0	0.0	0.0	0.5	0.0	12.1	1.4	0.0	4.1
Prop In Lane	0.58		0.16	0.10		0.71	1.00		0.02	1.00		0.12
Lane Grp Cap(c), veh/h	451	0	0	449	0	0	44	0	710	119	0	777
V/C Ratio(X)	0.20	0.00	0.00	0.61	0.00	0.00	0.46	0.00	0.80	0.47	0.00	0.32
Avail Cap(c_a), veh/h	694	0	0	741	0	0	193	0	1257	231	0	777
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	0.0	0.0	17.0	0.0	0.0	22.2	0.0	13.1	20.8	0.0	9.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.3	0.0	0.0	7.3	0.0	2.1	2.9	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	2.4	0.0	0.0	0.3	0.0	3.9	0.6	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.2	0.0	0.0	18.3	0.0	0.0	29.6	0.0	15.2	23.7	0.0	9.5
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	A
Approach Vol, veh/h		90			274			585				305
Approach Delay, s/veh		15.2			18.3			15.7				12.1
Approach LOS		B			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	23.4		14.6	6.2	25.4		14.6				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+I1), s	3.4	14.1		3.9	2.5	6.1		9.0				
Green Ext Time (p_c), s	0.0	2.9		0.3	0.0	0.9		1.0				

Intersection Summary

HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Queues  
21: Sutton Way & Dorsey Dr



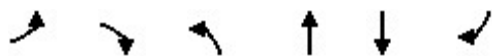
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	479	461	454	412	151
v/c Ratio	0.44	0.53	0.77	0.33	0.75	0.26
Control Delay	29.2	8.3	28.5	5.2	35.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	8.3	28.5	5.2	35.3	6.0
Queue Length 50th (ft)	52	71	154	59	152	0
Queue Length 95th (ft)	105	129	#289	124	#342	42
Internal Link Dist (ft)	1535			1385	682	
Turn Bay Length (ft)		300	300			
Base Capacity (vph)	564	1059	793	1440	551	574
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.45	0.58	0.32	0.75	0.26

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
21: Sutton Way & Dorsey Dr

MITIG8 Cumulative PM Peak  
01/07/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	133	441	424	418	379	139
Future Volume (veh/h)	133	441	424	418	379	139
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	479	461	454	412	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	433	849	521	1145	463	393
Arrive On Green	0.24	0.24	0.29	0.61	0.25	0.25
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	145	479	461	454	412	151
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	4.4	13.1	16.1	8.1	13.8	5.2
Cycle Q Clear(g_c), s	4.4	13.1	16.1	8.1	13.8	5.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	433	849	521	1145	463	393
V/C Ratio(X)	0.33	0.56	0.89	0.40	0.89	0.38
Avail Cap(c_a), veh/h	492	902	692	1145	480	407
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.3	10.1	22.0	6.5	23.6	20.4
Incr Delay (d2), s/veh	0.5	0.7	10.6	0.2	17.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.2	7.7	2.5	8.0	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.7	10.8	32.6	6.7	41.5	21.0
LnGrp LOS	C	B	C	A	D	C
Approach Vol, veh/h				915	563	
Approach Delay, s/veh				13.1	19.7	36.0
Approach LOS		B		B	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		44.6		20.5	23.7	20.8
Change Period (Y+Rc), s		* 4.7		* 4.7	* 4.7	* 4.7
Max Green Setting (Gmax), s		* 21		* 18	* 25	* 17
Max Q Clear Time (g_c+l1), s		10.1		15.1	18.1	15.8
Green Ext Time (p_c), s		2.1		0.8	0.9	0.3

Intersection Summary

HCM 6th Ctrl Delay	22.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



# MOVEMENT SUMMARY

 Site: 21 [Dorsey Dr / Sutton Way]

MITIG8 Cumulative PM  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	461	3.0	0.756	15.3	LOS C	10.9	278.2	0.73	0.54	0.83	29.4
8	T1	454	3.0	0.756	15.3	LOS C	10.9	278.2	0.73	0.54	0.83	29.4
Approach		915	3.0	0.756	15.3	LOS C	10.9	278.2	0.73	0.54	0.83	29.4
North: RoadName												
4	T1	412	3.0	0.680	16.5	LOS C	7.9	201.4	0.82	1.08	1.49	29.9
14	R2	151	3.0	0.680	16.5	LOS C	7.9	201.4	0.82	1.08	1.49	29.1
Approach		563	3.0	0.680	16.5	LOS C	7.9	201.4	0.82	1.08	1.49	29.7
West: RoadName												
5	L2	145	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	29.1
12	R2	479	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	28.4
Approach		624	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	28.5
All Vehicles		2102	3.0	0.756	16.1	LOS C	10.9	278.2	0.79	0.85	1.22	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Queues  
21: Sutton Way & Dorsey Dr

MITIG8 Cumulative 1530 PM  
01/07/2020



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	479	461	454	412	151
v/c Ratio	0.44	0.53	0.77	0.33	0.75	0.26
Control Delay	29.2	8.3	28.5	5.2	35.3	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	8.3	28.5	5.2	35.3	6.0
Queue Length 50th (ft)	52	71	154	59	152	0
Queue Length 95th (ft)	105	129	#289	124	#342	42
Internal Link Dist (ft)	1535			1385	682	
Turn Bay Length (ft)		300	300			
Base Capacity (vph)	564	1059	793	1440	551	574
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.45	0.58	0.32	0.75	0.26

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
 21: Sutton Way & Dorsey Dr

MITIG8 Cumulative 1530 PM  
 01/07/2020



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	133	441	424	418	379	139
Future Volume (veh/h)	133	441	424	418	379	139
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	479	461	454	412	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	433	849	521	1145	463	393
Arrive On Green	0.24	0.24	0.29	0.61	0.25	0.25
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	145	479	461	454	412	151
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	4.4	13.1	16.1	8.1	13.8	5.2
Cycle Q Clear(g_c), s	4.4	13.1	16.1	8.1	13.8	5.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	433	849	521	1145	463	393
V/C Ratio(X)	0.33	0.56	0.89	0.40	0.89	0.38
Avail Cap(c_a), veh/h	492	902	692	1145	480	407
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.3	10.1	22.0	6.5	23.6	20.4
Incr Delay (d2), s/veh	0.5	0.7	10.6	0.2	17.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.2	7.7	2.5	8.0	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.7	10.8	32.6	6.7	41.5	21.0
LnGrp LOS	C	B	C	A	D	C
Approach Vol, veh/h	624			915	563	
Approach Delay, s/veh	13.1			19.7	36.0	
Approach LOS	B			B	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		44.6		20.5	23.7	20.8
Change Period (Y+Rc), s		* 4.7		* 4.7	* 4.7	* 4.7
Max Green Setting (Gmax), s		* 21		* 18	* 25	* 17
Max Q Clear Time (g_c+l1), s		10.1		15.1	18.1	15.8
Green Ext Time (p_c), s		2.1		0.8	0.9	0.3

Intersection Summary

HCM 6th Ctrl Delay	22.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.





# MOVEMENT SUMMARY

 Site: 21 [Dorsey Dr / Sutton Way]

MITIG8 Cumulative 1530  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	461	3.0	0.756	15.3	LOS C	10.9	278.2	0.73	0.54	0.83	29.4
8	T1	454	3.0	0.756	15.3	LOS C	10.9	278.2	0.73	0.54	0.83	29.4
Approach		915	3.0	0.756	15.3	LOS C	10.9	278.2	0.73	0.54	0.83	29.4
North: RoadName												
4	T1	412	3.0	0.680	16.5	LOS C	7.9	201.4	0.82	1.08	1.49	29.9
14	R2	151	3.0	0.680	16.5	LOS C	7.9	201.4	0.82	1.08	1.49	29.1
Approach		563	3.0	0.680	16.5	LOS C	7.9	201.4	0.82	1.08	1.49	29.7
West: RoadName												
5	L2	145	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	29.1
12	R2	479	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	28.4
Approach		624	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	28.5
All Vehicles		2102	3.0	0.756	16.1	LOS C	10.9	278.2	0.79	0.85	1.22	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Monday, January 6, 2020 5:53:01 PM

Project: C:\Users\JDF\KDA\Reports\Nevada County\ldaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 29.1 Cum PM.sip8

Queues  
14: E. Bennett Rd/Brunswick Rd





















Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	113	274	29	615	56	339
v/c Ratio	0.43	0.53	0.14	0.72	0.22	0.35
Control Delay	22.6	13.1	28.2	18.1	27.4	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	13.1	28.2	18.1	27.4	10.1
Queue Length 50th (ft)	25	28	8	152	16	39
Queue Length 95th (ft)	76	98	35	296	55	139
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	531	890	214	1483	256	1501
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.31	0.14	0.41	0.22	0.23

Intersection Summary

HCM 6th Signalized Intersection Summary  
 14: E. Bennett Rd/Brunswick Rd

MITIG8 Cumulative plus Project AM Peak  
 Centennial Site

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	22	25	25	48	181	27	560	12	52	286	29
Future Volume (veh/h)	58	22	25	25	48	181	27	560	12	52	286	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	62	24	27	27	52	195	29	602	13	56	308	31
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	102	77	101	84	255	59	736	16	117	731	74
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.03	0.39	0.39	0.07	0.42	0.42
Sat Flow, veh/h	675	484	364	92	396	1205	1781	1897	41	1781	1739	175
Grp Volume(v), veh/h	113	0	0	274	0	0	29	0	615	56	0	339
Grp Sat Flow(s),veh/h/ln	1523	0	0	1693	0	0	1781	0	1938	1781	0	1914
Q Serve(g_s), s	0.0	0.0	0.0	2.8	0.0	0.0	0.8	0.0	13.9	1.5	0.0	6.1
Cycle Q Clear(g_c), s	2.7	0.0	0.0	7.4	0.0	0.0	0.8	0.0	13.9	1.5	0.0	6.1
Prop In Lane	0.55		0.24	0.10		0.71	1.00		0.02	1.00		0.09
Lane Grp Cap(c), veh/h	437	0	0	440	0	0	59	0	752	117	0	804
V/C Ratio(X)	0.26	0.00	0.00	0.62	0.00	0.00	0.49	0.00	0.82	0.48	0.00	0.42
Avail Cap(c_a), veh/h	656	0	0	703	0	0	183	0	1193	219	0	804
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.1	0.0	0.0	18.0	0.0	0.0	23.1	0.0	13.4	22.0	0.0	9.9
Incr Delay (d2), s/veh	0.3	0.0	0.0	1.4	0.0	0.0	6.1	0.0	2.5	3.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	2.6	0.0	0.0	0.4	0.0	4.6	0.6	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.5	0.0	0.0	19.5	0.0	0.0	29.3	0.0	15.9	25.0	0.0	10.3
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		113			274			644				395
Approach Delay, s/veh		16.5			19.5			16.5				12.4
Approach LOS		B			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.3	25.4		15.0	6.7	27.0		15.0				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+I1), s	3.5	15.9		4.7	2.8	8.1		9.4				
Green Ext Time (p_c), s	0.0	3.1		0.4	0.0	1.2		1.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				15.9								
HCM 6th LOS				B								
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												



## Queues

## MITIG8 Cumulative plus Project PM Peak

## 13: Brunswick Rd &amp; Whispering Pines Ln

Centennial Site



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	203	104	39	802	845
v/c Ratio	0.49	0.23	0.13	0.81	0.53
Control Delay	24.4	6.8	26.4	17.2	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	6.8	26.4	17.2	12.9
Queue Length 50th (ft)	52	0	10	166	66
Queue Length 95th (ft)	136	34	43	362	198
Internal Link Dist (ft)	1470			317	1215
Turn Bay Length (ft)	100		200		
Base Capacity (vph)	659	654	292	1543	2170
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.16	0.13	0.52	0.39

## Intersection Summary

HCM 6th Signalized Intersection Summary  
 13: Brunswick Rd & Whispering Pines Ln

MITIG8 Cumulative plus Project PM Peak  
 Centennial Site



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	193	99	37	762	715	87
Future Volume (veh/h)	193	99	37	762	715	87
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	203	104	39	802	753	92
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	329	293	124	1028	1144	140
Arrive On Green	0.18	0.18	0.07	0.55	0.36	0.36
Sat Flow, veh/h	1781	1585	1781	1870	3281	389
Grp Volume(v), veh/h	203	104	39	802	420	425
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1777	1800
Q Serve(g_s), s	4.4	2.4	0.9	14.2	8.4	8.4
Cycle Q Clear(g_c), s	4.4	2.4	0.9	14.2	8.4	8.4
Prop In Lane	1.00	1.00	1.00			0.22
Lane Grp Cap(c), veh/h	329	293	124	1028	638	646
V/C Ratio(X)	0.62	0.36	0.31	0.78	0.66	0.66
Avail Cap(c_a), veh/h	761	677	338	1332	1265	1282
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.8	15.0	18.6	7.5	11.3	11.3
Incr Delay (d2), s/veh	1.9	0.7	1.4	2.3	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.1	0.3	3.0	2.4	2.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.7	15.7	20.1	9.8	12.5	12.5
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	307			841	845	
Approach Delay, s/veh	17.0			10.3	12.5	
Approach LOS	B			B	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		29.7		12.5	8.0	21.6
Change Period (Y+Rc), s		6.5		* 4.7	5.1	6.5
Max Green Setting (Gmax), s		30.0		* 18	8.0	30.0
Max Q Clear Time (g_c+I1), s		16.2		6.4	2.9	10.4
Green Ext Time (p_c), s		4.5		0.7	0.0	4.8
<b>Intersection Summary</b>						
HCM 6th Ctrl Delay			12.2			
HCM 6th LOS			B			
<b>Notes</b>						
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.						

Queues  
14: E. Bennett Rd/Brunswick Rd



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	143	22	444	153	658
v/c Ratio	0.25	0.36	0.10	0.63	0.57	0.50
Control Delay	15.1	12.4	22.2	16.7	33.6	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	12.4	22.2	16.7	33.6	9.9
Queue Length 50th (ft)	12	14	5	89	36	80
Queue Length 95th (ft)	46	57	24	176	#135	#298
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	808	862	223	1512	268	1539
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.17	0.10	0.29	0.57	0.43



















Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



HCM 6th Signalized Intersection Summary  
 14: E. Bennett Rd/Brunswick Rd

MITIG8 Cumulative plus Project PM Peak  
 Centennial Site

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	24	27	23	40	79	22	406	34	151	574	77
Future Volume (veh/h)	33	24	27	23	40	79	22	406	34	151	574	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	33	24	27	23	40	80	22	410	34	153	580	78
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	98	78	132	81	134	48	561	46	222	695	93
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.03	0.32	0.32	0.12	0.41	0.41
Sat Flow, veh/h	484	693	558	179	572	954	1781	1772	147	1781	1679	226
Grp Volume(v), veh/h	84	0	0	143	0	0	22	0	444	153	0	658
Grp Sat Flow(s),veh/h/ln	1735	0	0	1705	0	0	1781	0	1919	1781	0	1905
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.5	0.0	8.0	3.2	0.0	12.1
Cycle Q Clear(g_c), s	1.6	0.0	0.0	3.0	0.0	0.0	0.5	0.0	8.0	3.2	0.0	12.1
Prop In Lane	0.39		0.32	0.16		0.56	1.00		0.08	1.00		0.12
Lane Grp Cap(c), veh/h	373	0	0	347	0	0	48	0	607	222	0	788
V/C Ratio(X)	0.23	0.00	0.00	0.41	0.00	0.00	0.45	0.00	0.73	0.69	0.00	0.84
Avail Cap(c_a), veh/h	875	0	0	885	0	0	229	0	1477	274	0	880
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	0.0	0.0	15.7	0.0	0.0	18.7	0.0	11.8	16.3	0.0	10.2
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.8	0.0	0.0	6.5	0.0	1.7	5.3	0.0	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	1.0	0.0	0.0	0.2	0.0	2.4	1.3	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	0.0	0.0	16.4	0.0	0.0	25.2	0.0	13.6	21.7	0.0	16.7
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		84			143			466				811
Approach Delay, s/veh		15.4			16.4			14.1				17.6
Approach LOS		B			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	18.8		10.2	6.2	22.6		10.2				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+I1), s	5.2	10.0		3.6	2.5	14.1		5.0				
Green Ext Time (p_c), s	0.0	2.3		0.3	0.0	1.4		0.6				

Intersection Summary

HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues  
21: Sutton Way & Dorsey Dr



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	483	466	454	412	151
v/c Ratio	0.44	0.54	0.77	0.33	0.76	0.27
Control Delay	29.3	8.3	28.8	5.2	35.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	8.3	28.8	5.2	35.5	6.0
Queue Length 50th (ft)	53	72	156	59	154	0
Queue Length 95th (ft)	105	131	#295	124	#342	42
Internal Link Dist (ft)	1377			1398	774	
Turn Bay Length (ft)		300	300			
Base Capacity (vph)	561	1056	790	1437	548	572
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.46	0.59	0.32	0.75	0.26

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
21: Sutton Way & Dorsey Dr

MITIG8 Cumulative plus Project PM Peak  
Centennial Site



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	133	444	429	418	379	139
Future Volume (veh/h)	133	444	429	418	379	139
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	483	466	454	412	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	434	853	525	1147	462	392
Arrive On Green	0.24	0.24	0.29	0.61	0.25	0.25
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	145	483	466	454	412	151
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	4.4	13.3	16.4	8.1	14.0	5.2
Cycle Q Clear(g_c), s	4.4	13.3	16.4	8.1	14.0	5.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	434	853	525	1147	462	392
V/C Ratio(X)	0.33	0.57	0.89	0.40	0.89	0.39
Avail Cap(c_a), veh/h	488	901	686	1147	476	403
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	10.1	22.1	6.5	23.9	20.6
Incr Delay (d2), s/veh	0.4	0.7	11.1	0.2	18.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	13.0	7.9	2.6	8.1	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.9	10.8	33.2	6.7	42.3	21.2
LnGrp LOS	C	B	C	A	D	C
Approach Vol, veh/h	628			920	563	
Approach Delay, s/veh	13.1			20.1	36.6	
Approach LOS	B			C	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		45.0		20.7	24.0	20.9
Change Period (Y+Rc), s		* 4.7		* 4.7	* 4.7	* 4.7
Max Green Setting (Gmax), s		* 21		* 18	* 25	* 17
Max Q Clear Time (g_c+I1), s		10.1		15.3	18.4	16.0
Green Ext Time (p_c), s		2.1		0.7	0.9	0.3

Intersection Summary

HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



# MOVEMENT SUMMARY

 Site: 21 [Dorsey Dr / Sutton Way]

MITIG8 Cumulative + Project PM  
 Centennial Site  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	463	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.4
8	T1	454	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.3
Approach		917	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.3
North: RoadName												
4	T1	412	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.8
14	R2	151	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.1
Approach		563	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.6
West: RoadName												
5	L2	145	3.0	0.714	17.2	LOS C	9.8	250.6	0.84	1.12	1.58	29.1
12	R2	483	3.0	0.714	17.2	LOS C	9.8	250.6	0.84	1.12	1.58	28.3
Approach		627	3.0	0.714	17.2	LOS C	9.8	250.6	0.84	1.12	1.58	28.5
All Vehicles		2108	3.0	0.757	16.2	LOS C	11.1	283.7	0.79	0.86	1.23	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Tuesday, January 7, 2020 10:01:08 AM

Project: C:\Users\JDF\KDAI\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 32.1 CPP Centennial PM.sip8



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	479	463	454	412	151
v/c Ratio	0.44	0.53	0.77	0.33	0.76	0.27
Control Delay	29.2	8.2	28.6	5.2	35.4	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	8.2	28.6	5.2	35.4	6.0
Queue Length 50th (ft)	52	71	155	59	153	0
Queue Length 95th (ft)	105	129	#293	124	#342	42
Internal Link Dist (ft)	1535			1385	682	
Turn Bay Length (ft)		300	300			
Base Capacity (vph)	562	1057	790	1438	549	573
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.45	0.59	0.32	0.75	0.26

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
21: Sutton Way & Dorsey Dr

MITIG8 Cumulative plus Project 1530 PM  
Centennial Site



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	133	441	426	418	379	139
Future Volume (veh/h)	133	441	426	418	379	139
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	479	463	454	412	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	433	850	522	1146	463	392
Arrive On Green	0.24	0.24	0.29	0.61	0.25	0.25
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	145	479	463	454	412	151
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	4.4	13.1	16.2	8.1	13.9	5.2
Cycle Q Clear(g_c), s	4.4	13.1	16.2	8.1	13.9	5.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	433	850	522	1146	463	392
V/C Ratio(X)	0.34	0.56	0.89	0.40	0.89	0.38
Avail Cap(c_a), veh/h	491	902	691	1146	479	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	10.1	22.0	6.5	23.7	20.4
Incr Delay (d2), s/veh	0.5	0.7	10.7	0.2	18.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.2	7.8	2.5	8.0	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.8	10.8	32.7	6.7	41.7	21.0
LnGrp LOS	C	B	C	A	D	C
Approach Vol, veh/h	624			917	563	
Approach Delay, s/veh	13.1			19.8	36.1	
Approach LOS	B			B	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		44.7		20.6	23.8	20.9
Change Period (Y+Rc), s		* 4.7		* 4.7	* 4.7	* 4.7
Max Green Setting (Gmax), s		* 21		* 18	* 25	* 17
Max Q Clear Time (g_c+I1), s		10.1		15.1	18.2	15.9
Green Ext Time (p_c), s		2.1		0.7	0.9	0.3

Intersection Summary

HCM 6th Ctrl Delay	22.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.





# MOVEMENT SUMMARY

 Site: 21 [Dorsey Dr / Sutton Way]

MITIG8 Cumulative + Project 1530  
 Centennial Site  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	463	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.4
8	T1	454	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.3
Approach		917	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.3
North: RoadName												
4	T1	412	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.8
14	R2	151	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.1
Approach		563	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.6
West: RoadName												
5	L2	145	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	29.1
12	R2	479	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	28.4
Approach		624	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	28.5
All Vehicles		2104	3.0	0.757	16.2	LOS C	11.1	283.7	0.79	0.85	1.23	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Tuesday, January 7, 2020 10:03:52 AM

Project: C:\Users\JDF\KDAI\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 34.1 CPP Centennial 1530 PM.sip8

Queues  
14: E. Bennett Rd/Brunswick Rd



















MITIG8 Cumulative plus Project AM Peak  
To SR 49



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	113	274	29	615	56	339
v/c Ratio	0.43	0.53	0.14	0.72	0.22	0.35
Control Delay	22.6	13.1	28.2	18.1	27.4	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	13.1	28.2	18.1	27.4	10.1
Queue Length 50th (ft)	25	28	8	152	16	39
Queue Length 95th (ft)	76	98	35	296	55	139
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	531	890	214	1483	256	1501
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.31	0.14	0.41	0.22	0.23
<b>Intersection Summary</b>						

HCM 6th Signalized Intersection Summary  
 14: E. Bennett Rd/Brunswick Rd

MITIG8 Cumulative plus Project AM Peak  
 To SR 49

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	22	25	25	48	181	27	560	12	52	286	29
Future Volume (veh/h)	58	22	25	25	48	181	27	560	12	52	286	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	62	24	27	27	52	195	29	602	13	56	308	31
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	257	102	77	101	84	255	59	736	16	117	731	74
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.03	0.39	0.39	0.07	0.42	0.42
Sat Flow, veh/h	675	484	364	92	396	1205	1781	1897	41	1781	1739	175
Grp Volume(v), veh/h	113	0	0	274	0	0	29	0	615	56	0	339
Grp Sat Flow(s),veh/h/ln	1523	0	0	1693	0	0	1781	0	1938	1781	0	1914
Q Serve(g_s), s	0.0	0.0	0.0	2.8	0.0	0.0	0.8	0.0	13.9	1.5	0.0	6.1
Cycle Q Clear(g_c), s	2.7	0.0	0.0	7.4	0.0	0.0	0.8	0.0	13.9	1.5	0.0	6.1
Prop In Lane	0.55		0.24	0.10		0.71	1.00		0.02	1.00		0.09
Lane Grp Cap(c), veh/h	437	0	0	440	0	0	59	0	752	117	0	804
V/C Ratio(X)	0.26	0.00	0.00	0.62	0.00	0.00	0.49	0.00	0.82	0.48	0.00	0.42
Avail Cap(c_a), veh/h	656	0	0	703	0	0	183	0	1193	219	0	804
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.1	0.0	0.0	18.0	0.0	0.0	23.1	0.0	13.4	22.0	0.0	9.9
Incr Delay (d2), s/veh	0.3	0.0	0.0	1.4	0.0	0.0	6.1	0.0	2.5	3.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	2.6	0.0	0.0	0.4	0.0	4.6	0.6	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.5	0.0	0.0	19.5	0.0	0.0	29.3	0.0	15.9	25.0	0.0	10.3
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		113			274			644				395
Approach Delay, s/veh		16.5			19.5			16.5				12.4
Approach LOS		B			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.3	25.4		15.0	6.7	27.0		15.0				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+I1), s	3.5	15.9		4.7	2.8	8.1		9.4				
Green Ext Time (p_c), s	0.0	3.1		0.4	0.0	1.2		1.0				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				15.9								
HCM 6th LOS				B								
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												



## Queues

## MITIG8 Cumulative plus Project PM Peak

## 13: Brunswick Rd &amp; Whispering Pines Ln

To SR 49



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Group Flow (vph)	203	96	31	811	853
v/c Ratio	0.50	0.22	0.11	0.80	0.52
Control Delay	25.2	7.0	26.7	16.6	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	7.0	26.7	16.6	12.6
Queue Length 50th (ft)	54	0	8	163	65
Queue Length 95th (ft)	137	33	37	370	201
Internal Link Dist (ft)	1470			317	1215
Turn Bay Length (ft)	100		200		
Base Capacity (vph)	643	636	285	1532	2119
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.15	0.11	0.53	0.40

## Intersection Summary

HCM 6th Signalized Intersection Summary  
 13: Brunswick Rd & Whispering Pines Ln

MITIG8 Cumulative plus Project PM Peak  
 To SR 49



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	193	91	29	770	723	87
Future Volume (veh/h)	193	91	29	770	723	87
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	203	96	31	811	761	92
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	327	291	103	1032	1192	144
Arrive On Green	0.18	0.18	0.06	0.55	0.37	0.37
Sat Flow, veh/h	1781	1585	1781	1870	3286	386
Grp Volume(v), veh/h	203	96	31	811	424	429
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1777	1801
Q Serve(g_s), s	4.4	2.2	0.7	14.5	8.3	8.3
Cycle Q Clear(g_c), s	4.4	2.2	0.7	14.5	8.3	8.3
Prop In Lane	1.00	1.00	1.00			0.21
Lane Grp Cap(c), veh/h	327	291	103	1032	663	672
V/C Ratio(X)	0.62	0.33	0.30	0.79	0.64	0.64
Avail Cap(c_a), veh/h	758	675	337	1327	1260	1277
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	15.0	19.1	7.5	10.9	10.9
Incr Delay (d2), s/veh	1.9	0.7	1.6	2.4	1.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	2.1	0.3	4.1	2.7	2.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.8	15.7	20.7	9.9	11.9	11.9
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h				842	853	
Approach Delay, s/veh				10.3	11.9	
Approach LOS				B	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		29.8		12.5	7.5	22.3
Change Period (Y+Rc), s		6.5		* 4.7	5.1	6.5
Max Green Setting (Gmax), s		30.0		* 18	8.0	30.0
Max Q Clear Time (g_c+l1), s		16.5		6.4	2.7	10.3
Green Ext Time (p_c), s		5.0		0.7	0.0	5.5

Intersection Summary

HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Notes

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues  
14: E. Bennett Rd/Brunswick Rd





















Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	84	143	22	444	153	658
v/c Ratio	0.25	0.36	0.10	0.63	0.57	0.50
Control Delay	15.1	12.4	22.2	16.7	33.6	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	12.4	22.2	16.7	33.6	9.9
Queue Length 50th (ft)	12	14	5	89	36	80
Queue Length 95th (ft)	46	57	24	176	#135	#298
Internal Link Dist (ft)	489	1867		1607		1129
Turn Bay Length (ft)			230		205	
Base Capacity (vph)	808	862	223	1512	268	1539
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.17	0.10	0.29	0.57	0.43

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
14: E. Bennett Rd/Brunswick Rd

MITIG8 Cumulative plus Project PM Peak  
To SR 49

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	24	27	23	40	79	22	406	34	151	574	77
Future Volume (veh/h)	33	24	27	23	40	79	22	406	34	151	574	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1945	1870	1870	1945	1870	1870	1945	1870	1870	1945	1870
Adj Flow Rate, veh/h	33	24	27	23	40	80	22	410	34	153	580	78
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	197	98	78	132	81	134	48	561	46	222	695	93
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.03	0.32	0.32	0.12	0.41	0.41
Sat Flow, veh/h	484	693	558	179	572	954	1781	1772	147	1781	1679	226
Grp Volume(v), veh/h	84	0	0	143	0	0	22	0	444	153	0	658
Grp Sat Flow(s),veh/h/ln	1735	0	0	1705	0	0	1781	0	1919	1781	0	1905
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.5	0.0	8.0	3.2	0.0	12.1
Cycle Q Clear(g_c), s	1.6	0.0	0.0	3.0	0.0	0.0	0.5	0.0	8.0	3.2	0.0	12.1
Prop In Lane	0.39		0.32	0.16		0.56	1.00		0.08	1.00		0.12
Lane Grp Cap(c), veh/h	373	0	0	347	0	0	48	0	607	222	0	788
V/C Ratio(X)	0.23	0.00	0.00	0.41	0.00	0.00	0.45	0.00	0.73	0.69	0.00	0.84
Avail Cap(c_a), veh/h	875	0	0	885	0	0	229	0	1477	274	0	880
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	0.0	0.0	15.7	0.0	0.0	18.7	0.0	11.8	16.3	0.0	10.2
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.8	0.0	0.0	6.5	0.0	1.7	5.3	0.0	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	1.0	0.0	0.0	0.2	0.0	2.4	1.3	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	0.0	0.0	16.4	0.0	0.0	25.2	0.0	13.6	21.7	0.0	16.7
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		84			143			466				811
Approach Delay, s/veh		15.4			16.4			14.1				17.6
Approach LOS		B			B			B				B
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	18.8		10.2	6.2	22.6		10.2				
Change Period (Y+Rc), s	5.1	6.5		* 4.7	5.1	6.5		* 4.7				
Max Green Setting (Gmax), s	6.0	30.0		* 18	5.0	18.0		* 18				
Max Q Clear Time (g_c+I1), s	5.2	10.0		3.6	2.5	14.1		5.0				
Green Ext Time (p_c), s	0.0	2.3		0.3	0.0	1.4		0.6				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				16.3								
HCM 6th LOS				B								
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												



Queues  
21: Sutton Way & Dorsey Dr



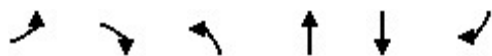
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	483	466	454	412	151
v/c Ratio	0.44	0.54	0.77	0.33	0.76	0.27
Control Delay	29.3	8.3	28.8	5.2	35.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	8.3	28.8	5.2	35.5	6.0
Queue Length 50th (ft)	53	72	156	59	154	0
Queue Length 95th (ft)	105	131	#295	124	#342	42
Internal Link Dist (ft)	379			610	692	
Turn Bay Length (ft)		300	300			
Base Capacity (vph)	561	1056	790	1437	548	572
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.46	0.59	0.32	0.75	0.26

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
21: Sutton Way & Dorsey Dr

MITIG8 Cumulative plus Project PM Peak  
To SR 49



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	133	444	429	418	379	139
Future Volume (veh/h)	133	444	429	418	379	139
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	483	466	454	412	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	434	853	525	1147	462	392
Arrive On Green	0.24	0.24	0.29	0.61	0.25	0.25
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	145	483	466	454	412	151
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	4.4	13.3	16.4	8.1	14.0	5.2
Cycle Q Clear(g_c), s	4.4	13.3	16.4	8.1	14.0	5.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	434	853	525	1147	462	392
V/C Ratio(X)	0.33	0.57	0.89	0.40	0.89	0.39
Avail Cap(c_a), veh/h	488	901	686	1147	476	403
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	10.1	22.1	6.5	23.9	20.6
Incr Delay (d2), s/veh	0.4	0.7	11.1	0.2	18.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	13.0	7.9	2.6	8.1	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.9	10.8	33.2	6.7	42.3	21.2
LnGrp LOS	C	B	C	A	D	C
Approach Vol, veh/h	628			920	563	
Approach Delay, s/veh	13.1			20.1	36.6	
Approach LOS	B			C	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		45.0		20.7	24.0	20.9
Change Period (Y+Rc), s		* 4.7		* 4.7	* 4.7	* 4.7
Max Green Setting (Gmax), s		* 21		* 18	* 25	* 17
Max Q Clear Time (g_c+I1), s		10.1		15.3	18.4	16.0
Green Ext Time (p_c), s		2.1		0.7	0.9	0.3

Intersection Summary

HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



# MOVEMENT SUMMARY

 Site: 21 [Dorsey Dr / Sutton Way]

MITIG8 Cumulative + Project PM  
 To SR 49  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	463	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.4
8	T1	454	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.3
Approach		917	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.3
North: RoadName												
4	T1	412	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.8
14	R2	151	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.1
Approach		563	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.6
West: RoadName												
5	L2	145	3.0	0.714	17.2	LOS C	9.8	250.6	0.84	1.12	1.58	29.1
12	R2	483	3.0	0.714	17.2	LOS C	9.8	250.6	0.84	1.12	1.58	28.3
Approach		627	3.0	0.714	17.2	LOS C	9.8	250.6	0.84	1.12	1.58	28.5
All Vehicles		2108	3.0	0.757	16.2	LOS C	11.1	283.7	0.79	0.86	1.23	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Sign Control.  
 Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.  
 LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).  
 Roundabout Capacity Model: US HCM 6.  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.  
 Gap-Acceptance Capacity: Traditional M1.  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Tuesday, January 7, 2020 10:19:56 AM

Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 37.1 CPP SR 49 PM.sip8



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	145	479	463	454	412	151
v/c Ratio	0.44	0.53	0.77	0.33	0.76	0.27
Control Delay	29.2	8.2	28.6	5.2	35.4	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	8.2	28.6	5.2	35.4	6.0
Queue Length 50th (ft)	52	71	155	59	153	0
Queue Length 95th (ft)	105	129	#293	124	#342	42
Internal Link Dist (ft)	1535			1385	682	
Turn Bay Length (ft)		300	300			
Base Capacity (vph)	562	1057	790	1438	549	573
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.45	0.59	0.32	0.75	0.26

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary  
21: Sutton Way & Dorsey Dr

MITIG8 Cumulative plus Project 1530 PM  
To SR 49



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	133	441	426	418	379	139
Future Volume (veh/h)	133	441	426	418	379	139
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	479	463	454	412	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	433	850	522	1146	463	392
Arrive On Green	0.24	0.24	0.29	0.61	0.25	0.25
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	145	479	463	454	412	151
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	4.4	13.1	16.2	8.1	13.9	5.2
Cycle Q Clear(g_c), s	4.4	13.1	16.2	8.1	13.9	5.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	433	850	522	1146	463	392
V/C Ratio(X)	0.34	0.56	0.89	0.40	0.89	0.38
Avail Cap(c_a), veh/h	491	902	691	1146	479	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	10.1	22.0	6.5	23.7	20.4
Incr Delay (d2), s/veh	0.5	0.7	10.7	0.2	18.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.2	7.8	2.5	8.0	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.8	10.8	32.7	6.7	41.7	21.0
LnGrp LOS	C	B	C	A	D	C
Approach Vol, veh/h	624			917	563	
Approach Delay, s/veh	13.1			19.8	36.1	
Approach LOS	B			B	D	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		44.7		20.6	23.8	20.9
Change Period (Y+Rc), s		* 4.7		* 4.7	* 4.7	* 4.7
Max Green Setting (Gmax), s		* 21		* 18	* 25	* 17
Max Q Clear Time (g_c+l1), s		10.1		15.1	18.2	15.9
Green Ext Time (p_c), s		2.1		0.7	0.9	0.3

Intersection Summary

HCM 6th Ctrl Delay	22.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.  
\* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



# MOVEMENT SUMMARY

 Site: 21 [Dorsey Dr / Sutton Way]

MITIG8 Cumulative + Project 1530

To SR 49

Site Category: (None)

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: RoadName												
3	L2	463	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.4
8	T1	454	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.3
Approach		917	3.0	0.757	15.4	LOS C	11.1	283.7	0.73	0.54	0.83	29.3
North: RoadName												
4	T1	412	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.8
14	R2	151	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.1
Approach		563	3.0	0.682	16.6	LOS C	7.9	202.3	0.83	1.08	1.49	29.6
West: RoadName												
5	L2	145	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	29.1
12	R2	479	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	28.4
Approach		624	3.0	0.711	17.0	LOS C	9.6	246.5	0.84	1.11	1.56	28.5
All Vehicles		2104	3.0	0.757	16.2	LOS C	11.1	283.7	0.79	0.85	1.23	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KD ANDERSON & ASSOCIATES INC. | Processed: Tuesday, January 7, 2020 10:21:12 AM

Project: C:\Users\JDF\KDA\Reports\Nevada County\Idaho-Maryland Rise Mine 5875-01\SIDRA\100 MITIG8\100 MITIG8 39.1 CPP SR 49 1530 PM.sip8



# TECHNICAL LOS APPENDIX IV

FOR

## IDAHO-MARYLAND MINE PROJECT TRAFFIC IMPACT ANALYSIS

Nevada County, CA

### QUEUES – CUMULATIVE SCENARIOS

*Prepared For:*

**Rise Grass Valley Inc.**

*Prepared By:*

**KD Anderson & Associates, Inc.**  
3853 Taylor Road, Suite G  
Loomis, CA 95650  
(916) 660-1555



April 8, 2021

*KD Anderson & Associates, Inc.*

Transportation Engineers

# **QUEUES – CUMULATIVE SCENARIOS**

CUMULATIVE

CUMULATIVE PLUS PROJECT – CENTENNIAL

CUMULATIVE PLUS PROJECT – SR 49

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	160	132	34	100	24
Average Queue (ft)	71	58	11	52	2
95th Queue (ft)	122	100	35	85	13
Link Distance (ft)	1196	1196		264	401
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				1	
Queuing Penalty (veh)				0	

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative AM Peak  
03/04/2020



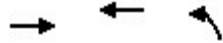
Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	393	465	274	552
v/c Ratio	0.76	0.49	0.66	0.55
Control Delay	35.6	24.7	34.3	7.7
Queue Delay	0.0	0.7	0.0	0.0
Total Delay	35.6	25.4	34.3	7.7
Queue Length 50th (ft)	154	88	110	73
Queue Length 95th (ft)	#330	161	212	166
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	704	1340	675	1007
Starvation Cap Reductn	0	524	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.56	0.57	0.41	0.55

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
7: Railroad Ave & Idaho Maryland Rd

Cumulative AM Peak  
03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	865	412	120
v/c Ratio	0.63	0.49	0.41
Control Delay	16.3	22.9	27.5
Queue Delay	0.1	0.0	0.0
Total Delay	16.4	22.9	27.5
Queue Length 50th (ft)	117	66	32
Queue Length 95th (ft)	204	128	95
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2538	1804	377
Starvation Cap Reductn	653	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.46	0.23	0.32
Intersection Summary			

Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative AM Peak  
03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	10	155	207	184	246	531	48	467
v/c Ratio	0.05	0.31	0.56	0.36	0.61	0.62	0.24	0.53
Control Delay	30.1	4.5	29.7	4.4	31.0	19.5	31.6	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	4.5	29.7	4.4	31.0	19.5	31.6	22.2
Queue Length 50th (ft)	3	0	63	0	72	151	15	72
Queue Length 95th (ft)	19	21	163	30	#220	#379	55	145
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	333	564	489	595	476	1082	220	1550
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.27	0.42	0.31	0.52	0.49	0.22	0.30

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
19: Centennial Dr & Idaho Maryland Rd

Cumulative AM Peak  
03/04/2020

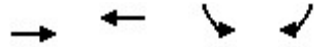


Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	207	354	24	231	93
v/c Ratio	0.16	0.29	0.04	0.16	0.13
Control Delay	6.5	2.4	12.9	3.6	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	2.4	12.9	3.6	9.9
Queue Length 50th (ft)	0	0	0	0	1
Queue Length 95th (ft)	82	42	21	48	49
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1724	1491	789	1820	1343
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.12	0.24	0.03	0.13	0.07

Intersection Summary

Queues  
 20: Idaho Maryland Rd & Sutton Way

Cumulative AM Peak  
 03/04/2020









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	222	286	46	132
v/c Ratio	0.41	0.50	0.13	0.32
Control Delay	17.5	14.4	19.8	7.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.5	14.4	19.8	7.5
Queue Length 50th (ft)	45	43	10	0
Queue Length 95th (ft)	117	120	39	39
Internal Link Dist (ft)	481	1255	1069	
Turn Bay Length (ft)				70
Base Capacity (vph)	1011	1001	773	766
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.29	0.06	0.17

Intersection Summary



Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative AM Peak  
01/12/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	64	212	645	161	322	251
v/c Ratio	0.29	0.33	0.81	0.21	0.71	0.17
Control Delay	32.7	7.8	29.1	3.8	33.9	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	7.8	29.1	3.8	33.9	3.0
Queue Length 50th (ft)	27	26	258	0	132	26
Queue Length 95th (ft)	63	64	#490	35	#254	54
Internal Link Dist (ft)	1010		930			663
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	407	754	919	860	575	1521
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.28	0.70	0.19	0.56	0.17

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	111	356	126	84
Average Queue (ft)	75	159	52	32
95th Queue (ft)	116	310	102	64
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	7			
Queuing Penalty (veh)	20			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	128	114	181	122	103
Average Queue (ft)	63	40	82	77	52
95th Queue (ft)	110	84	141	121	93
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			5	1
Queuing Penalty (veh)	1			8	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	8		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	T
Maximum Queue (ft)	69	122	134	129	5	140	106	100	134	122
Average Queue (ft)	26	50	58	52	0	62	42	34	70	55
95th Queue (ft)	57	96	102	107	5	112	81	75	115	102
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	0						
Queuing Penalty (veh)		0	0	0						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						1	0			
Queuing Penalty (veh)						1	0			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	161	174	102	161	173	72	106	205	224	103	74
Average Queue (ft)	61	87	58	59	76	18	50	98	133	29	40
95th Queue (ft)	133	159	99	132	151	53	87	183	199	76	67
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	1	1	2	3						
Queuing Penalty (veh)	0	2	0	8	10						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	2		0	0	0	0		
Queuing Penalty (veh)			3	3		0	0	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	106	138	126	131	4	213	216	322
Average Queue (ft)	35	40	22	29	0	149	142	69
95th Queue (ft)	86	100	79	88	0	223	231	242
Link Distance (ft)	456	456	327	327	327	138	138	890
Upstream Blk Time (%)						19	15	
Queuing Penalty (veh)						0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	98	108	141	150	162	138	169	249	75	131	90	76
Average Queue (ft)	36	56	71	83	75	59	81	124	21	68	37	35
95th Queue (ft)	77	92	122	131	129	105	139	204	53	115	71	68
Link Distance (ft)			327	327			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)						0	1					
Queuing Penalty (veh)						1	2					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	87
Average Queue (ft)	32
95th Queue (ft)	67
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	119	195	56	78	94	101	268	188
Average Queue (ft)	53	105	15	38	46	28	124	66
95th Queue (ft)	99	173	41	68	80	75	214	135
Link Distance (ft)	211	211		1558	1558		800	
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)						0	0	0
Queuing Penalty (veh)						0	3	0

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	191	97	109	127	134	113	91
Average Queue (ft)	89	29	49	57	55	53	45
95th Queue (ft)	159	64	91	109	111	95	77
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	1	0					

Zone Summary

Zone wide Queuing Penalty: 71

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	236	197	47	98	37
Average Queue (ft)	108	86	15	48	7
95th Queue (ft)	190	160	42	78	26
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative PM Peak  
03/04/2020



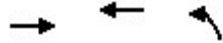
Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	333	977	167	272
v/c Ratio	0.72	0.75	0.54	0.25
Control Delay	33.0	25.9	33.9	1.7
Queue Delay	0.0	50.9	0.0	0.0
Total Delay	33.0	76.7	33.9	1.7
Queue Length 50th (ft)	125	184	65	0
Queue Length 95th (ft)	225	#369	134	29
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	684	1306	656	1056
Starvation Cap Reductn	0	580	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.49	1.35	0.25	0.26

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
7: Railroad Ave & Idaho Maryland Rd

Cumulative PM Peak  
03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	649	913	164
v/c Ratio	0.65	0.72	0.63
Control Delay	23.3	22.6	38.8
Queue Delay	0.1	0.0	0.0
Total Delay	23.4	22.6	38.8
Queue Length 50th (ft)	118	163	59
Queue Length 95th (ft)	162	245	#143
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2186	1392	267
Starvation Cap Reductn	485	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.38	0.66	0.61

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative PM Peak  
03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	76	230	64	109	231	678	152	540
v/c Ratio	0.33	0.37	0.29	0.28	0.67	0.84	0.80	0.44
Control Delay	36.6	3.6	35.5	1.7	40.9	32.1	69.0	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	3.6	35.5	1.7	40.9	32.1	69.0	21.7
Queue Length 50th (ft)	34	0	29	0	103	284	74	107
Queue Length 95th (ft)	76	28	66	0	#209	#537	#196	166
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	287	667	423	545	411	927	190	1354
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.34	0.15	0.20	0.56	0.73	0.80	0.40

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



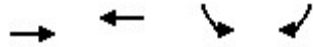
Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	403	183	16	461	461
v/c Ratio	0.59	0.26	0.06	0.61	0.70
Control Delay	15.2	3.2	21.2	13.1	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	3.2	21.2	13.1	24.2
Queue Length 50th (ft)	67	0	3	80	76
Queue Length 95th (ft)	154	22	19	109	#311
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1361	1206	311	1734	654
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.30	0.15	0.05	0.27	0.70

#### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
20: Idaho Maryland Rd & Sutton Way

Cumulative PM Peak  
03/04/2020









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	421	304	186	271
v/c Ratio	0.77	0.66	0.54	0.51
Control Delay	31.2	25.3	28.9	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.2	25.3	28.9	7.4
Queue Length 50th (ft)	129	85	61	0
Queue Length 95th (ft)	#278	156	120	46
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	664	678	491	635
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.63	0.45	0.38	0.43

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative PM Peak  
01/12/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	171	395	421	52	143	620
v/c Ratio	0.49	0.50	0.66	0.09	0.42	0.49
Control Delay	28.8	6.7	22.4	5.3	27.2	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	6.7	22.4	5.3	27.2	7.5
Queue Length 50th (ft)	51	25	119	0	43	104
Queue Length 95th (ft)	136	99	246	20	110	192
Internal Link Dist (ft)	986		960			673
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	499	1066	1097	952	705	1649
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.37	0.38	0.05	0.20	0.38
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	115	596	203	216
Average Queue (ft)	89	276	77	80
95th Queue (ft)	118	651	183	181
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	21			
Queuing Penalty (veh)	60			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	145	121	198	134	123
Average Queue (ft)	91	38	90	100	83
95th Queue (ft)	148	89	162	140	129
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			22	11
Queuing Penalty (veh)	5			43	21
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	4		
Queuing Penalty (veh)		0	10		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	61	126	135	169	20	269	140	227	263	186
Average Queue (ft)	20	60	62	91	2	106	76	89	129	67
95th Queue (ft)	49	108	110	163	12	217	142	190	213	139
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	1						
Queuing Penalty (veh)		0	0	2						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						6	2		0	0
Queuing Penalty (veh)						13	4		0	0

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	175	197	102	178	181	114	190	212	222	99	105
Average Queue (ft)	105	145	64	69	107	34	91	111	139	36	45
95th Queue (ft)	187	211	108	153	182	87	157	194	203	83	82
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	9	2	4	9						
Queuing Penalty (veh)	5	32	0	17	33						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	4		0	7	0	0		
Queuing Penalty (veh)			5	5		1	2	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	147	157	240	299	244	216	244	442
Average Queue (ft)	56	62	69	90	15	136	175	109
95th Queue (ft)	120	128	178	223	124	217	261	358
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	10	28	
Queuing Penalty (veh)				0	1	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	124	147	203	223	263	205	354	406	339	597	340	135
Average Queue (ft)	63	84	114	123	128	112	149	230	202	301	176	63
95th Queue (ft)	110	131	177	190	219	188	276	352	356	502	357	117
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)			0	0	0							
Queuing Penalty (veh)			0	0	0							
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)				0	1	8	8		0	13	0	
Queuing Penalty (veh)				0	2	24	14		2	75	2	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	131	15
Average Queue (ft)	63	1
95th Queue (ft)	113	15
Link Distance (ft)	229	229
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	207	213	162	197	166	139	139	118
Average Queue (ft)	91	89	97	66	59	59	65	54
95th Queue (ft)	169	171	165	144	122	112	114	95
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	1	2						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			3	0				
Queuing Penalty (veh)			7	0				

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	537	180	233	133	137	190	71
Average Queue (ft)	228	128	171	44	41	94	34
95th Queue (ft)	472	224	258	102	106	163	59
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			5	0	0		
Queuing Penalty (veh)			16	0	0		
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	13	1					
Queuing Penalty (veh)	49	7					

Zone Summary

Zone wide Queuing Penalty: 462



Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	72	68	31	59	3
Average Queue (ft)	37	28	7	33	0
95th Queue (ft)	59	56	28	46	2
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

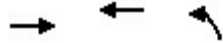
Cumulative 0630 AM  
03/04/2020



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	241	234	129	425
v/c Ratio	0.39	0.21	0.25	0.40
Control Delay	17.4	15.8	19.3	2.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.4	15.8	19.3	2.5
Queue Length 50th (ft)	52	25	29	4
Queue Length 95th (ft)	127	61	81	39
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	1150	2180	1101	1176
Starvation Cap Reductn	0	237	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.21	0.12	0.12	0.36
<b>Intersection Summary</b>				

Queues  
7: Railroad Ave & Idaho Maryland Rd

Cumulative 0630 AM  
03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	667	222	57
v/c Ratio	0.52	0.27	0.18
Control Delay	12.4	17.0	18.2
Queue Delay	0.0	0.0	0.0
Total Delay	12.4	17.0	18.2
Queue Length 50th (ft)	67	26	11
Queue Length 95th (ft)	123	60	41
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	3099	2483	490
Starvation Cap Reductn	494	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.26	0.09	0.12
Intersection Summary			

Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative 0630 AM  
03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	56	56	134	97	115	255	14	298
v/c Ratio	0.18	0.11	0.32	0.18	0.29	0.31	0.05	0.32
Control Delay	12.2	1.2	24.6	0.7	24.8	14.4	27.7	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	1.2	24.6	0.7	24.8	14.4	27.7	21.4
Queue Length 50th (ft)	2	0	40	0	35	52	4	46
Queue Length 95th (ft)	34	4	100	0	90	157	22	96
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	464	785	760	799	744	1254	345	1974
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.07	0.18	0.12	0.15	0.20	0.04	0.15

Intersection Summary

Queues  
 19: Centennial Dr & Idaho Maryland Rd

Cumulative 0630 AM  
 03/04/2020

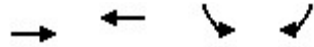


Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	147	273	8	134	50
v/c Ratio	0.11	0.22	0.01	0.09	0.07
Control Delay	4.8	2.1	9.7	1.9	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	2.1	9.7	1.9	7.6
Queue Length 50th (ft)	0	0	0	0	0
Queue Length 95th (ft)	56	36	10	26	28
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1766	1515	879	1863	1523
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.18	0.01	0.07	0.03

Intersection Summary

Queues  
20: Idaho Maryland Rd & Sutton Way







Cumulative 0630 AM  
03/04/2020



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	132	155	26	59
v/c Ratio	0.20	0.23	0.05	0.12
Control Delay	12.3	9.4	14.7	6.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.3	9.4	14.7	6.5
Queue Length 50th (ft)	22	16	4	0
Queue Length 95th (ft)	59	54	20	22
Internal Link Dist (ft)	481	1255	1954	
Turn Bay Length (ft)				70
Base Capacity (vph)	1299	1264	1071	981
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.10	0.12	0.02	0.06
<b>Intersection Summary</b>				

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative 0630 AM  
01/12/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	33	86	308	138	227	122
v/c Ratio	0.10	0.13	0.47	0.21	0.42	0.09
Control Delay	21.9	2.9	15.7	4.4	17.4	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	2.9	15.7	4.4	17.4	2.3
Queue Length 50th (ft)	5	0	38	0	29	0
Queue Length 95th (ft)	35	19	164	32	134	24
Internal Link Dist (ft)	1021		899			683
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	775	1076	1433	1246	1024	1752
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.08	0.21	0.11	0.22	0.07
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	96	150	71	58
Average Queue (ft)	38	61	20	18
95th Queue (ft)	84	115	52	44
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	100	54	83	82	78
Average Queue (ft)	45	16	37	38	33
95th Queue (ft)	86	44	73	68	67
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	36	51	53	65	26	68	54	43	84	53
Average Queue (ft)	10	18	18	22	2	25	17	8	35	14
95th Queue (ft)	33	40	43	47	13	56	42	30	68	40
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				



Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	51	83	72	62	101	31	30	126	148	54	51
Average Queue (ft)	9	22	28	12	25	6	9	39	82	13	20
95th Queue (ft)	32	61	61	44	72	24	30	94	134	40	45
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)			0	0	0						
Queuing Penalty (veh)			0	0	0						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			0	0							
Queuing Penalty (veh)			0	0							

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	19	24	15	26	165	146	20
Average Queue (ft)	2	3	1	2	82	62	1
95th Queue (ft)	10	13	8	13	141	106	15
Link Distance (ft)	456	456	327	327	138	138	890
Upstream Blk Time (%)					3	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	47	72	65	89	65	57	87	113	32	74	50	37
Average Queue (ft)	13	31	18	42	23	21	32	45	4	29	16	13
95th Queue (ft)	39	61	53	77	52	48	69	88	20	58	37	38
Link Distance (ft)			327	327			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	31
Average Queue (ft)	5
95th Queue (ft)	24
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	78	121	44	74	46	49	120	68
Average Queue (ft)	31	50	12	31	13	17	54	35
95th Queue (ft)	63	98	36	57	36	44	98	59
Link Distance (ft)	211	211		1417	1417		800	
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	100	51	88	80	72	49	65
Average Queue (ft)	37	17	36	27	16	15	30
95th Queue (ft)	80	41	73	64	53	43	53
Link Distance (ft)	1539		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

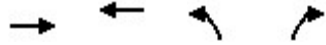
Zone wide Queuing Penalty: 3

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	205	137	42	83	43
Average Queue (ft)	91	66	15	40	7
95th Queue (ft)	153	114	41	66	28
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative 1530 PM  
03/04/2020



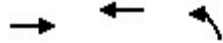
Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	417	783	191	276
v/c Ratio	0.77	0.70	0.58	0.28
Control Delay	34.8	26.5	35.6	3.4
Queue Delay	0.0	51.6	0.0	0.0
Total Delay	34.8	78.1	35.6	3.4
Queue Length 50th (ft)	173	162	83	14
Queue Length 95th (ft)	#325	260	151	48
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	676	1290	648	985
Starvation Cap Reductn	0	583	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	1.11	0.29	0.28

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
7: Railroad Ave & Idaho Maryland Rd

Cumulative 1530 PM  
03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	645	727	197
v/c Ratio	0.62	0.66	0.68
Control Delay	20.9	21.6	38.9
Queue Delay	0.1	0.0	0.0
Total Delay	20.9	21.6	38.9
Queue Length 50th (ft)	99	120	62
Queue Length 95th (ft)	166	195	#189
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2355	1504	291
Starvation Cap Reductn	504	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.35	0.48	0.68

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative 1530 PM  
03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	231	67	73	184	681	146	522
v/c Ratio	0.32	0.39	0.30	0.18	0.59	0.84	0.77	0.40
Control Delay	36.5	3.8	35.6	1.0	38.3	32.1	66.0	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	3.8	35.6	1.0	38.3	32.1	66.0	20.7
Queue Length 50th (ft)	32	0	30	0	82	285	71	99
Queue Length 95th (ft)	74	28	68	0	151	#542	#188	161
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	285	663	419	543	408	921	189	1381
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.35	0.16	0.13	0.45	0.74	0.77	0.38

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
19: Centennial Dr & Idaho Maryland Rd

Cumulative 1530 PM  
03/04/2020



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	350	159	14	401	401
v/c Ratio	0.55	0.25	0.05	0.57	0.59
Control Delay	15.0	3.5	19.8	12.6	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	3.5	19.8	12.6	19.2
Queue Length 50th (ft)	56	0	3	66	57
Queue Length 95th (ft)	156	29	19	112	#285
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1416	1241	324	1752	680
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.13	0.04	0.23	0.59

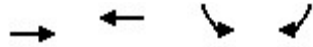
Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Queues  
20: Idaho Maryland Rd & Sutton Way

Cumulative 1530 PM  
03/04/2020



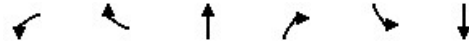
Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	389	282	172	250
v/c Ratio	0.73	0.62	0.50	0.49
Control Delay	28.6	23.4	27.4	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	28.6	23.4	27.4	7.4
Queue Length 50th (ft)	111	71	52	0
Queue Length 95th (ft)	#274	155	119	53
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	693	706	513	636
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.56	0.40	0.34	0.39

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative 1530 PM  
01/12/2021



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	199	379	408	85	198	489
v/c Ratio	0.60	0.43	0.71	0.16	0.55	0.44
Control Delay	33.7	5.2	26.3	5.0	29.5	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	5.2	26.3	5.0	29.5	7.2
Queue Length 50th (ft)	64	20	127	0	64	81
Queue Length 95th (ft)	#178	83	252	27	147	136
Internal Link Dist (ft)	1009		828			673
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	424	1066	957	853	599	1598
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.36	0.43	0.10	0.33	0.31

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	109	126	108	109
Average Queue (ft)	77	56	52	46
95th Queue (ft)	116	106	93	88
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	7			
Queuing Penalty (veh)	22			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	147	90	178	125	118
Average Queue (ft)	80	26	77	78	64
95th Queue (ft)	139	63	137	113	104
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			4	1
Queuing Penalty (veh)	4			5	2
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	5		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	53	119	118	166	28	210	140	185	213	159
Average Queue (ft)	19	51	56	83	2	99	68	71	111	60
95th Queue (ft)	46	94	97	149	14	175	130	145	175	119
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	0						
Queuing Penalty (veh)		0	0	1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						5	1			
Queuing Penalty (veh)						10	1			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	170	188	102	185	182	88	173	148	166	75	108
Average Queue (ft)	102	127	68	68	84	28	72	52	92	23	49
95th Queue (ft)	177	202	106	156	166	68	131	117	148	57	84
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	4	3	5	5						
Queuing Penalty (veh)	2	16	0	20	21						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			3	5		0	3				
Queuing Penalty (veh)			9	6		0	1				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	173	202	212	306	138	211	238	611
Average Queue (ft)	78	88	68	92	9	137	183	175
95th Queue (ft)	152	171	173	223	84	215	262	530
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	12	34	0
Queuing Penalty (veh)				0	0	0	0	0
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	134	144	207	230	252	202	260	354	336	550	340	149
Average Queue (ft)	63	81	114	126	129	102	125	211	181	267	138	59
95th Queue (ft)	114	127	178	199	224	177	218	317	326	435	296	115
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)				0	0							
Queuing Penalty (veh)				0	0							
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)			0	0	0	7	7		0	9	0	
Queuing Penalty (veh)			0	0	1	21	11		1	49	0	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	128
Average Queue (ft)	60
95th Queue (ft)	111
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	209	191	162	232	187	144	152	128
Average Queue (ft)	99	82	92	74	62	60	67	53
95th Queue (ft)	180	160	160	163	137	111	125	97
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	1	1						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			3	0		0	0	
Queuing Penalty (veh)			6	1		0	0	

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	534	180	238	125	124	198	81
Average Queue (ft)	216	126	171	45	41	96	36
95th Queue (ft)	421	218	253	104	101	165	63
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			4				
Queuing Penalty (veh)			12				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	12	1					
Queuing Penalty (veh)	42	6					

Zone Summary

Zone wide Queuing Penalty: 276

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Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

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Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	91	72	33	50	11
Average Queue (ft)	51	37	10	31	1
95th Queue (ft)	78	61	33	46	7
Link Distance (ft)	1196	1196		263	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative 1830 PM  
03/04/2020

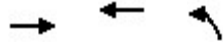


Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	171	334	79	116
v/c Ratio	0.30	0.30	0.16	0.14
Control Delay	14.8	13.2	16.5	1.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.8	13.2	16.5	1.8
Queue Length 50th (ft)	31	34	15	0
Queue Length 95th (ft)	83	72	50	15
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	1332	2576	1293	1212
Starvation Cap Reductn	0	179	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.13	0.14	0.06	0.10
<b>Intersection Summary</b>				



Queues  
7: Railroad Ave & Idaho Maryland Rd

Cumulative 1830 PM  
03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	249	290	51
v/c Ratio	0.31	0.35	0.16
Control Delay	13.5	13.9	12.3
Queue Delay	0.0	0.0	0.0
Total Delay	13.5	13.9	12.3
Queue Length 50th (ft)	21	25	6
Queue Length 95th (ft)	47	54	27
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	3478	2361	439
Starvation Cap Reductn	48	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.07	0.12	0.12
Intersection Summary			

Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative 1830 PM  
03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	38	126	45	54	66	289	109	314
v/c Ratio	0.10	0.24	0.12	0.10	0.16	0.35	0.28	0.20
Control Delay	23.3	3.3	23.0	0.4	22.2	15.9	26.2	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	3.3	23.0	0.4	22.2	15.9	26.2	15.2
Queue Length 50th (ft)	8	0	10	0	14	54	24	30
Queue Length 95th (ft)	39	18	43	0	56	158	#103	86
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	606	889	855	870	837	1384	402	2283
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.14	0.05	0.06	0.08	0.21	0.27	0.14

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
 19: Centennial Dr & Idaho Maryland Rd

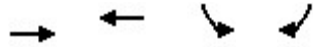
Cumulative 1830 PM  
 03/04/2020



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	114	45	3	98	64
v/c Ratio	0.18	0.08	0.01	0.14	0.07
Control Delay	8.7	4.4	11.0	5.3	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	4.4	11.0	5.3	8.2
Queue Length 50th (ft)	8	0	0	7	4
Queue Length 95th (ft)	45	15	5	21	29
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1788	1521	523	1863	1226
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.03	0.01	0.05	0.05
<b>Intersection Summary</b>					

Queues  
 20: Idaho Maryland Rd & Sutton Way







Cumulative 1830 PM  
 03/04/2020



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	128	53	38	80
v/c Ratio	0.20	0.09	0.08	0.16
Control Delay	10.8	8.2	12.5	5.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.8	8.2	12.5	5.7
Queue Length 50th (ft)	9	2	3	0
Queue Length 95th (ft)	53	23	24	23
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	1406	1353	1154	1060
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.09	0.04	0.03	0.08
<b>Intersection Summary</b>				

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative 1830 PM  
01/12/2021

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	47	27	230	26	122	404
v/c Ratio	0.09	0.04	0.23	0.03	0.20	0.28
Control Delay	16.4	3.4	11.5	6.5	14.4	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	3.4	11.5	6.5	14.4	3.4
Queue Length 50th (ft)	6	0	24	0	14	0
Queue Length 95th (ft)	36	9	107	13	69	86
Internal Link Dist (ft)	948		843			643
Turn Bay Length (ft)	165			405	405	
Base Capacity (vph)	1047	1237	1532	1306	1195	1810
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.15	0.02	0.10	0.22
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	111	162	82	82
Average Queue (ft)	79	70	35	34
95th Queue (ft)	119	131	70	67
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	9			
Queuing Penalty (veh)	27			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	140	56	118	117	100
Average Queue (ft)	68	15	50	59	43
95th Queue (ft)	123	44	98	103	82
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			2	1
Queuing Penalty (veh)	2			2	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			1		
Queuing Penalty (veh)			1		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	58	73	90	88	12	103	71	86	126	84
Average Queue (ft)	20	28	40	33	1	47	32	25	63	30
95th Queue (ft)	50	59	75	69	7	85	59	63	106	65
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	133	163	99	142	132	68	100	134	154	59	68
Average Queue (ft)	35	64	52	33	44	20	49	40	85	17	29
95th Queue (ft)	88	128	90	98	105	54	84	98	140	47	54
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	1	1						
Queuing Penalty (veh)	0	0	0	2	2						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	1		0	0				
Queuing Penalty (veh)			1	1		0	0				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	59	73	51	73	200	157	74
Average Queue (ft)	11	20	7	9	108	60	4
95th Queue (ft)	39	55	29	42	180	110	40
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)					5	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	55	73	95	107	121	116	90	125	108	176	101	63
Average Queue (ft)	16	34	41	53	59	42	37	62	33	87	42	22
95th Queue (ft)	45	66	80	92	98	84	73	109	75	141	80	52
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	80
Average Queue (ft)	31
95th Queue (ft)	63
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	79	104	76	74	56	62	66	77
Average Queue (ft)	33	45	32	32	20	22	27	35
95th Queue (ft)	65	90	64	60	45	54	58	62
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								



Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	99	50	127	64	62	75	57
Average Queue (ft)	42	18	62	26	14	35	26
95th Queue (ft)	83	40	108	58	46	64	49
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Zone Summary

Zone wide Queuing Penalty: 40



Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	140	140	33	100	24
Average Queue (ft)	71	57	11	50	1
95th Queue (ft)	117	98	35	81	9
Link Distance (ft)	1196	1196		263	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queues

6: SR 49 EB Ramps & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	401	493	274	587
v/c Ratio	0.77	0.50	0.67	0.58
Control Delay	36.8	25.0	35.2	8.6
Queue Delay	0.0	1.1	0.0	0.0
Total Delay	36.8	26.1	35.2	8.6
Queue Length 50th (ft)	165	97	117	91
Queue Length 95th (ft)	#341	172	212	192
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	688	1311	659	1001
Starvation Cap Reductn	0	558	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.65	0.42	0.59

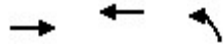
Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Queues

7: Railroad Ave & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	908	440	120
v/c Ratio	0.64	0.53	0.42
Control Delay	16.5	24.1	29.4
Queue Delay	0.2	0.0	0.0
Total Delay	16.7	24.1	29.4
Queue Length 50th (ft)	131	75	35
Queue Length 95th (ft)	223	141	99
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2447	1826	359
Starvation Cap Reductn	692	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.52	0.24	0.33
<b>Intersection Summary</b>			

Queues

12: Brunswick Rd & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	10	207	207	184	279	549	48	495
v/c Ratio	0.05	0.37	0.57	0.37	0.65	0.62	0.25	0.56
Control Delay	30.4	4.4	30.9	4.4	32.8	19.5	32.3	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	4.4	30.9	4.4	32.8	19.5	32.3	22.7
Queue Length 50th (ft)	3	0	64	0	86	158	16	77
Queue Length 95th (ft)	19	24	163	30	#262	#400	55	155
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	319	586	469	580	457	1038	211	1487
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.35	0.44	0.32	0.61	0.53	0.23	0.33

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Queues

19: Centennial Dr & Idaho Maryland Rd

03/04/2020



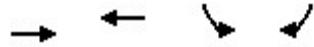
Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	249	354	24	258	93
v/c Ratio	0.18	0.28	0.04	0.18	0.13
Control Delay	6.3	2.2	13.9	3.6	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	2.2	13.9	3.6	10.6
Queue Length 50th (ft)	0	0	0	0	1
Queue Length 95th (ft)	97	41	23	54	52
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1695	1472	765	1801	1329
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.03	0.14	0.07

Intersection Summary

Queues

20: Idaho Maryland Rd & Sutton Way

03/04/2020









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	266	320	54	132
v/c Ratio	0.46	0.53	0.16	0.32
Control Delay	18.5	16.0	21.9	7.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.5	16.0	21.9	7.8
Queue Length 50th (ft)	59	56	13	0
Queue Length 95th (ft)	146	149	47	41
Internal Link Dist (ft)	481	1255	1069	
Turn Bay Length (ft)				70
Base Capacity (vph)	969	959	773	766
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.33	0.07	0.17

Intersection Summary



Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project AM Peak  
Centennial Site

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	64	212	707	161	322	341
v/c Ratio	0.31	0.34	0.84	0.20	0.75	0.22
Control Delay	33.4	9.3	30.9	3.6	36.9	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	9.3	30.9	3.6	36.9	3.1
Queue Length 50th (ft)	27	32	299	0	132	37
Queue Length 95th (ft)	63	72	#559	35	#254	75
Internal Link Dist (ft)	979		866			683
Turn Bay Length (ft)	165			400	410	
Base Capacity (vph)	375	702	845	804	529	1521
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.30	0.84	0.20	0.61	0.22

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	106	442	130	101
Average Queue (ft)	78	209	55	34
95th Queue (ft)	117	478	103	73
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	8			
Queuing Penalty (veh)	23			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	134	119	207	128	115
Average Queue (ft)	63	44	87	80	58
95th Queue (ft)	109	98	159	123	105
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			6	2
Queuing Penalty (veh)	1			10	2
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	4		
Queuing Penalty (veh)		0	9		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	T
Maximum Queue (ft)	64	108	113	139	10	160	120	128	147	149
Average Queue (ft)	28	49	55	53	0	67	42	39	76	55
95th Queue (ft)	57	91	97	108	5	126	82	90	123	109
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	0						
Queuing Penalty (veh)		0	0	0						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						1	0			
Queuing Penalty (veh)						2	0			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	153	174	102	168	173	56	101	217	214	91	81
Average Queue (ft)	62	91	59	62	82	18	46	103	135	30	40
95th Queue (ft)	133	168	99	140	154	48	83	186	198	68	67
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	1	2	3	4						
Queuing Penalty (veh)	0	3	0	10	12						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	3			0	0	0		
Queuing Penalty (veh)			5	3			0	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	116	127	112	135	212	224	353
Average Queue (ft)	35	40	22	28	145	144	67
95th Queue (ft)	87	97	75	91	214	230	254
Link Distance (ft)	456	456	327	327	138	138	890
Upstream Blk Time (%)					18	15	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	96	102	154	163	167	125	153	246	73	137	118	83
Average Queue (ft)	34	55	76	85	74	59	82	123	21	69	39	31
95th Queue (ft)	74	88	131	137	134	103	137	206	54	116	82	67
Link Distance (ft)			327	327			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)					0	0	1					
Queuing Penalty (veh)					0	1	2					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	82
Average Queue (ft)	36
95th Queue (ft)	73
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	124	201	58	87	95	119	284	190
Average Queue (ft)	54	105	16	38	47	29	126	70
95th Queue (ft)	100	175	44	71	83	87	226	147
Link Distance (ft)	211	211		1558	1558		800	
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)				0			1	0
Queuing Penalty (veh)				0			4	0

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	209	141	116	122	138	132	85
Average Queue (ft)	94	32	52	56	55	59	44
95th Queue (ft)	167	85	97	106	111	106	73
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	2	0					

Zone Summary

Zone wide Queuing Penalty: 89

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	217	179	37	99	46
Average Queue (ft)	106	84	13	50	8
95th Queue (ft)	182	149	38	83	29
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queues

6: SR 49 EB Ramps & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	339	1022	167	296
v/c Ratio	0.73	0.79	0.54	0.28
Control Delay	33.3	27.2	34.1	2.0
Queue Delay	0.0	50.5	0.0	0.0
Total Delay	33.3	77.7	34.1	2.0
Queue Length 50th (ft)	128	197	65	3
Queue Length 95th (ft)	230	#396	134	35
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	679	1299	652	1075
Starvation Cap Reductn	0	569	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	1.40	0.26	0.28

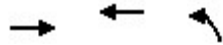
Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# Queues

## 7: Railroad Ave & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	679	960	164
v/c Ratio	0.68	0.74	0.65
Control Delay	24.1	23.6	40.5
Queue Delay	0.1	0.0	0.0
Total Delay	24.2	23.6	40.5
Queue Length 50th (ft)	126	177	60
Queue Length 95th (ft)	170	266	#146
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2122	1350	259
Starvation Cap Reductn	504	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.42	0.71	0.63

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Queues

12: Brunswick Rd & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	76	262	64	109	281	705	152	557
v/c Ratio	0.35	0.40	0.30	0.28	0.78	0.84	0.85	0.45
Control Delay	37.2	3.6	35.9	1.8	47.5	32.2	77.7	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	3.6	35.9	1.8	47.5	32.2	77.7	22.0
Queue Length 50th (ft)	34	0	29	0	130	302	74	111
Queue Length 95th (ft)	76	29	66	0	#275	#569	#196	171
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	268	669	396	525	384	868	178	1252
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.39	0.16	0.21	0.73	0.81	0.85	0.44

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Queues

19: Centennial Dr & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	435	183	16	513	461
v/c Ratio	0.60	0.25	0.06	0.65	0.73
Control Delay	15.0	3.0	22.2	13.5	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	3.0	22.2	13.5	26.2
Queue Length 50th (ft)	74	0	3	92	86
Queue Length 95th (ft)	166	22	20	124	#322
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1313	1169	300	1713	631
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.16	0.05	0.30	0.73

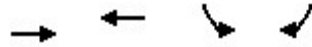
Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# Queues

## 20: Idaho Maryland Rd & Sutton Way

03/04/2020









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	452	363	192	271
v/c Ratio	0.82	0.74	0.57	0.52
Control Delay	35.6	29.3	30.8	7.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.6	29.3	30.8	7.5
Queue Length 50th (ft)	155	114	68	0
Queue Length 95th (ft)	#309	194	123	46
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	624	639	461	613
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	0.57	0.42	0.44

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project PM Peak  
Centennial Site

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	171	395	511	52	143	682
v/c Ratio	0.51	0.54	0.73	0.08	0.43	0.53
Control Delay	31.2	9.9	24.2	5.1	29.3	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	9.9	24.2	5.1	29.3	7.8
Queue Length 50th (ft)	58	48	160	0	49	125
Queue Length 95th (ft)	136	130	316	20	110	223
Internal Link Dist (ft)	1019		868			743
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	463	986	1045	910	654	1585
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.40	0.49	0.06	0.22	0.43
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	113	655	197	195
Average Queue (ft)	88	354	81	74
95th Queue (ft)	117	872	173	163
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	19			
Queuing Penalty (veh)	55			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	148	122	190	134	120
Average Queue (ft)	94	34	89	101	80
95th Queue (ft)	153	84	158	137	126
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	2			22	9
Queuing Penalty (veh)	6			43	18
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	4		
Queuing Penalty (veh)		0	10		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	51	124	127	169	36	258	139	221	237	162
Average Queue (ft)	20	60	60	97	3	101	79	84	128	62
95th Queue (ft)	47	107	107	171	20	186	141	179	206	125
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	1						
Queuing Penalty (veh)		0	0	2						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						4	2			
Queuing Penalty (veh)						9	5			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	172	193	102	183	183	91	207	207	221	119	108
Average Queue (ft)	105	145	64	68	110	31	92	108	138	36	46
95th Queue (ft)	186	211	103	154	192	73	165	190	201	77	83
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	9	2	5	10						
Queuing Penalty (veh)	3	35	0	18	37						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	5		0	8	0	0	0	
Queuing Penalty (veh)			5	5		0	2	0	0	0	

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	155	178	236	318	244	215	234	463
Average Queue (ft)	63	70	69	94	15	141	183	123
95th Queue (ft)	129	142	181	241	127	224	261	362
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	12	33	0
Queuing Penalty (veh)				1	0	0	0	0
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	143	163	220	238	274	204	303	400	340	664	340	143
Average Queue (ft)	69	88	122	132	130	111	144	235	224	328	185	62
95th Queue (ft)	123	141	191	207	228	186	253	351	375	555	372	117
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)		0	0	0	1	10	11		1	16	0	
Queuing Penalty (veh)		0	0	1	2	30	19		3	91	2	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	144
Average Queue (ft)	68
95th Queue (ft)	124
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	213	200	163	217	187	123	162	147
Average Queue (ft)	102	86	91	72	68	58	73	53
95th Queue (ft)	179	175	158	152	136	106	135	99
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	1	2						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			2	0			0	
Queuing Penalty (veh)			6	0			0	

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	558	180	231	120	130	200	73
Average Queue (ft)	233	122	165	48	47	99	33
95th Queue (ft)	476	221	254	104	108	167	60
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			5		0		
Queuing Penalty (veh)			14		0		
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	13	2					
Queuing Penalty (veh)	47	8					

Zone Summary

Zone wide Queuing Penalty: 484



Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	64	59	31	57	2
Average Queue (ft)	36	27	7	33	0
95th Queue (ft)	56	48	28	44	2
Link Distance (ft)	1196	1196		264	401
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queues

6: SR 49 EB Ramps & Idaho Maryland Rd

03/04/2020



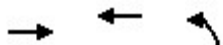
Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	249	262	129	461
v/c Ratio	0.33	0.19	0.20	0.40
Control Delay	17.3	15.6	19.7	2.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.3	15.6	19.7	2.8
Queue Length 50th (ft)	55	30	30	10
Queue Length 95th (ft)	140	68	87	51
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	1130	2145	1082	1170
Starvation Cap Reductn	0	286	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.14	0.12	0.39

Intersection Summary

# Queues

## 7: Railroad Ave & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	711	250	57
v/c Ratio	0.53	0.31	0.18
Control Delay	12.5	17.9	19.4
Queue Delay	0.0	0.0	0.0
Total Delay	12.5	17.9	19.4
Queue Length 50th (ft)	75	30	12
Queue Length 95th (ft)	136	69	44
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	3022	2276	470
Starvation Cap Reductn	534	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.29	0.11	0.12
<b>Intersection Summary</b>			

Queues

12: Brunswick Rd & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	160	134	97	149	274	14	327
v/c Ratio	0.02	0.32	0.35	0.19	0.38	0.25	0.06	0.39
Control Delay	24.8	4.3	22.1	0.8	22.1	10.6	24.5	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	4.3	22.1	0.8	22.1	10.6	24.5	19.0
Queue Length 50th (ft)	1	0	29	0	32	30	3	36
Queue Length 95th (ft)	12	17	99	0	108	159	22	103
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	451	704	659	723	645	1359	299	2101
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.23	0.20	0.13	0.23	0.20	0.05	0.16

Intersection Summary

Queues

19: Centennial Dr & Idaho Maryland Rd

03/04/2020



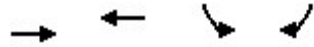
Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	191	273	8	162	50
v/c Ratio	0.13	0.21	0.01	0.10	0.07
Control Delay	4.6	2.0	10.1	1.8	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	2.0	10.1	1.8	8.0
Queue Length 50th (ft)	0	0	0	0	0
Queue Length 95th (ft)	70	35	10	31	29
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1755	1507	851	1859	1533
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.18	0.01	0.09	0.03

Intersection Summary

Queues

20: Idaho Maryland Rd & Sutton Way

03/04/2020









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	177	189	35	59
v/c Ratio	0.32	0.34	0.09	0.15
Control Delay	14.3	12.0	16.4	7.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.3	12.0	16.4	7.3
Queue Length 50th (ft)	31	25	6	0
Queue Length 95th (ft)	81	74	27	23
Internal Link Dist (ft)	481	1255	1954	
Turn Bay Length (ft)				70
Base Capacity (vph)	1190	1161	899	833
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.15	0.16	0.04	0.07

Intersection Summary

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 0630 AM  
Centennial Site

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	33	86	370	138	227	212
v/c Ratio	0.10	0.13	0.50	0.20	0.41	0.15
Control Delay	24.0	3.3	15.7	4.0	18.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	3.3	15.7	4.0	18.7	2.3
Queue Length 50th (ft)	5	0	50	0	32	0
Queue Length 95th (ft)	38	21	203	32	146	40
Internal Link Dist (ft)	1148		927			713
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	792	1033	1385	1209	984	1707
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.08	0.27	0.11	0.23	0.12
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	90	121	59	53
Average Queue (ft)	39	59	19	16
95th Queue (ft)	80	103	49	41
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	1			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	108	60	92	85	68
Average Queue (ft)	46	16	38	38	31
95th Queue (ft)	84	45	75	70	61
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	44	48	54	73	27	67	48	44	83	54
Average Queue (ft)	9	19	19	23	3	26	17	7	36	14
95th Queue (ft)	34	41	44	51	16	58	43	29	67	38
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)										
Queuing Penalty (veh)										



Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	53	91	70	67	99	36	34	130	148	50	57
Average Queue (ft)	10	25	29	13	28	7	9	46	90	11	21
95th Queue (ft)	34	65	61	46	76	28	30	106	142	37	46
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)			0	0	0						
Queuing Penalty (veh)			0	0	0						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			0	0							
Queuing Penalty (veh)			0	0							

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	30	38	23	36	182	129	39
Average Queue (ft)	3	4	2	2	84	60	2
95th Queue (ft)	18	20	13	15	152	102	23
Link Distance (ft)	456	456	327	327	138	138	890
Upstream Blk Time (%)					3	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	45	57	74	98	56	60	80	124	26	65	48	35
Average Queue (ft)	12	28	21	42	23	22	32	48	3	29	16	12
95th Queue (ft)	38	53	56	81	50	49	66	95	17	55	37	37
Link Distance (ft)			327	327			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	35
Average Queue (ft)	4
95th Queue (ft)	23
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	72	111	38	73	45	55	121	70
Average Queue (ft)	29	46	11	32	13	16	56	32
95th Queue (ft)	60	90	33	60	33	46	103	57
Link Distance (ft)	211	211		1417	1417		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	96	60	92	84	76	49	63
Average Queue (ft)	35	19	35	27	18	15	30
95th Queue (ft)	75	44	74	64	56	42	52
Link Distance (ft)	1539		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 2

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	183	134	38	79	40
Average Queue (ft)	89	62	15	39	7
95th Queue (ft)	147	105	40	64	26
Link Distance (ft)	1196	1196		263	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queues

6: SR 49 EB Ramps & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	417	798	191	276
v/c Ratio	0.77	0.71	0.58	0.28
Control Delay	35.0	26.7	35.7	3.4
Queue Delay	0.0	51.6	0.0	0.0
Total Delay	35.0	78.3	35.7	3.4
Queue Length 50th (ft)	173	166	83	14
Queue Length 95th (ft)	#325	266	151	48
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	673	1286	646	985
Starvation Cap Reductn	0	580	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	1.13	0.30	0.28

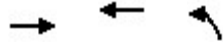
Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# Queues

## 7: Railroad Ave & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	645	743	197
v/c Ratio	0.63	0.67	0.68
Control Delay	21.0	21.8	39.2
Queue Delay	0.1	0.0	0.0
Total Delay	21.0	21.8	39.2
Queue Length 50th (ft)	100	124	63
Queue Length 95th (ft)	166	200	#189
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2344	1496	289
Starvation Cap Reductn	506	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.35	0.50	0.68

### Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Queues

12: Brunswick Rd & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	231	67	73	203	693	146	525
v/c Ratio	0.33	0.39	0.31	0.19	0.64	0.84	0.80	0.40
Control Delay	36.8	3.8	35.9	1.0	39.9	31.9	69.7	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.8	3.8	35.9	1.0	39.9	31.9	69.7	20.9
Queue Length 50th (ft)	32	0	30	0	90	293	71	102
Queue Length 95th (ft)	74	28	68	0	166	#558	#188	161
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	275	652	404	532	394	889	182	1320
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.35	0.17	0.14	0.52	0.78	0.80	0.40

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Queues

19: Centennial Dr & Idaho Maryland Rd

03/04/2020



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	350	159	14	417	401
v/c Ratio	0.54	0.24	0.05	0.58	0.59
Control Delay	14.8	3.5	20.0	12.8	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	3.5	20.0	12.8	19.5
Queue Length 50th (ft)	56	0	3	70	59
Queue Length 95th (ft)	156	29	19	117	#285
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1404	1232	321	1752	675
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.13	0.04	0.24	0.59

Intersection Summary

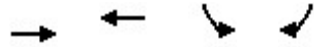
# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



Queues

20: Idaho Maryland Rd & Sutton Way

03/04/2020









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	389	301	172	250
v/c Ratio	0.73	0.64	0.50	0.49
Control Delay	29.0	24.4	27.8	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	29.0	24.4	27.8	7.4
Queue Length 50th (ft)	114	79	53	0
Queue Length 95th (ft)	#274	168	119	53
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	685	699	507	632
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.43	0.34	0.40

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 1530 PM  
Centennial Site

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	199	379	448	85	198	500
v/c Ratio	0.61	0.44	0.75	0.15	0.56	0.44
Control Delay	34.9	6.4	27.6	4.9	30.3	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	6.4	27.6	4.9	30.3	7.2
Queue Length 50th (ft)	67	29	145	0	67	84
Queue Length 95th (ft)	#178	99	283	27	147	140
Internal Link Dist (ft)	1014		980			673
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	413	1034	932	833	583	1576
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.37	0.48	0.10	0.34	0.32

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	112	137	112	108
Average Queue (ft)	77	55	49	46
95th Queue (ft)	115	109	92	88
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	8			
Queuing Penalty (veh)	23			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	141	97	166	128	113
Average Queue (ft)	77	26	74	78	61
95th Queue (ft)	134	66	136	113	102
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			4	1
Queuing Penalty (veh)	3			4	1
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	2		
Queuing Penalty (veh)		0	4		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	52	125	132	169	35	228	140	184	210	146
Average Queue (ft)	18	55	56	87	3	102	73	71	109	64
95th Queue (ft)	45	102	100	159	20	185	139	144	176	118
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	0						
Queuing Penalty (veh)		0	0	1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						5	1			
Queuing Penalty (veh)						10	3			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	172	186	102	190	176	87	146	144	161	83	105
Average Queue (ft)	101	125	68	72	89	29	69	60	95	28	47
95th Queue (ft)	178	203	106	167	172	66	117	126	151	65	86
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	4	3	6	5						
Queuing Penalty (veh)	3	13	0	25	22						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			3	6		0	2				
Queuing Penalty (veh)			11	8		0	1				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	181	218	256	321	226	216	235	464
Average Queue (ft)	79	88	84	110	19	138	178	122
95th Queue (ft)	156	175	201	248	145	218	258	388
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	11	30	
Queuing Penalty (veh)				1	1	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	156	169	219	239	262	199	300	390	339	619	336	139
Average Queue (ft)	68	86	115	127	123	102	136	230	206	303	154	58
95th Queue (ft)	123	138	189	207	220	179	235	347	355	545	324	110
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)				0	0							
Queuing Penalty (veh)				0	0							
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)		0	0	0	1	7	9		0	12	0	
Queuing Penalty (veh)		0	0	0	2	22	15		2	70	1	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	134	14
Average Queue (ft)	57	0
95th Queue (ft)	107	14
Link Distance (ft)	229	229
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	214	209	163	232	180	116	146	135
Average Queue (ft)	96	89	93	68	60	54	67	56
95th Queue (ft)	177	169	159	148	126	100	120	100
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)	1	1						
Queuing Penalty (veh)	2	2						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			2	1				0
Queuing Penalty (veh)			6	1				0

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	420	180	233	143	153	192	82
Average Queue (ft)	193	124	169	45	41	95	36
95th Queue (ft)	346	217	250	105	104	162	64
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			4				
Queuing Penalty (veh)			11				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	10	1					
Queuing Penalty (veh)	34	6					

Zone Summary

Zone wide Queuing Penalty: 311

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	94	82	31	58	20
Average Queue (ft)	51	39	11	32	1
95th Queue (ft)	79	64	34	49	10
Link Distance (ft)	1196	1196		264	401
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
03/04/2020

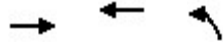


Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	177	362	79	139
v/c Ratio	0.30	0.31	0.16	0.16
Control Delay	15.1	13.2	17.0	1.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.1	13.2	17.0	1.8
Queue Length 50th (ft)	34	37	16	0
Queue Length 95th (ft)	87	78	52	17
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	1310	2534	1271	1203
Starvation Cap Reductn	0	256	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.14	0.16	0.06	0.12
<b>Intersection Summary</b>				



Queues  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
03/04/2020



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	277	318	51
v/c Ratio	0.34	0.38	0.17
Control Delay	13.9	14.3	12.7
Queue Delay	0.0	0.0	0.0
Total Delay	13.9	14.3	12.7
Queue Length 50th (ft)	24	28	6
Queue Length 95th (ft)	53	60	28
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	3461	2328	433
Starvation Cap Reductn	73	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.08	0.14	0.12
Intersection Summary			

Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
03/04/2020



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	38	160	45	54	100	307	109	333
v/c Ratio	0.10	0.28	0.12	0.10	0.23	0.36	0.28	0.22
Control Delay	23.8	3.1	23.3	0.4	21.8	15.9	26.8	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	3.1	23.3	0.4	21.8	15.9	26.8	16.0
Queue Length 50th (ft)	8	0	10	0	22	58	25	33
Queue Length 95th (ft)	39	19	43	0	76	168	#106	95
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	601	898	847	865	830	1376	398	2261
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.18	0.05	0.06	0.12	0.22	0.27	0.15

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

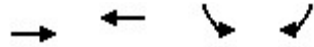


Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	142	45	3	126	64
v/c Ratio	0.21	0.08	0.01	0.16	0.07
Control Delay	8.6	4.3	11.3	5.3	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	4.3	11.3	5.3	8.4
Queue Length 50th (ft)	10	0	0	9	4
Queue Length 95th (ft)	54	15	5	25	30
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1781	1516	556	1863	1289
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.03	0.01	0.07	0.05

Intersection Summary

Queues  
 20: Idaho Maryland Rd & Sutton Way

Cumulative plus Project 1830 PM  
 03/04/2020









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	156	87	43	80
v/c Ratio	0.27	0.16	0.10	0.18
Control Delay	12.8	9.9	14.3	6.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.8	9.9	14.3	6.1
Queue Length 50th (ft)	27	9	8	0
Queue Length 95th (ft)	65	36	28	24
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	1287	1262	991	921
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.12	0.07	0.04	0.09

Intersection Summary

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 1830 PM  
Centennial Site

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	47	27	291	26	122	465
v/c Ratio	0.09	0.04	0.28	0.03	0.20	0.32
Control Delay	17.7	3.9	11.5	6.2	15.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	3.9	11.5	6.2	15.5	3.5
Queue Length 50th (ft)	6	0	33	0	16	0
Queue Length 95th (ft)	38	10	137	13	74	103
Internal Link Dist (ft)	1248		978			663
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	1016	1204	1488	1269	1165	1800
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.20	0.02	0.10	0.26
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	113	166	90	95
Average Queue (ft)	82	74	33	34
95th Queue (ft)	120	140	69	69
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	11			
Queuing Penalty (veh)	31			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	143	57	131	113	99
Average Queue (ft)	74	16	52	58	44
95th Queue (ft)	133	44	102	101	85
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			2	0
Queuing Penalty (veh)	3			2	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			1		
Queuing Penalty (veh)			1		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	63	75	86	99	17	125	77	92	126	81
Average Queue (ft)	21	26	38	36	1	47	33	27	65	30
95th Queue (ft)	50	57	71	74	8	91	62	69	109	66
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	133	169	102	121	134	65	106	130	153	66	65
Average Queue (ft)	37	72	54	36	47	20	50	39	82	19	30
95th Queue (ft)	92	141	93	99	110	53	85	92	133	51	56
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	1	1						
Queuing Penalty (veh)	0	1	0	2	2						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	1		0	0				
Queuing Penalty (veh)			1	1		0	0				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	61	68	52	115	203	121	52
Average Queue (ft)	12	19	6	9	102	58	3
95th Queue (ft)	40	52	26	53	177	97	27
Link Distance (ft)	456	456	334	334	145	145	915
Upstream Blk Time (%)				0	4	0	
Queuing Penalty (veh)				0	0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	53	69	101	103	112	94	96	143	92	162	111	70
Average Queue (ft)	15	34	41	54	58	41	39	63	29	85	42	24
95th Queue (ft)	43	63	80	91	96	79	74	110	68	136	83	57
Link Distance (ft)			334	334				1884	1884		1476	229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	74
Average Queue (ft)	28
95th Queue (ft)	61
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	79	118	82	73	61	59	70	70
Average Queue (ft)	33	46	31	31	20	21	23	35
95th Queue (ft)	67	93	63	60	45	51	54	59
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220	220	
Storage Blk Time (%)								
Queuing Penalty (veh)								



Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	90	55	138	64	60	72	60
Average Queue (ft)	41	19	61	25	12	35	27
95th Queue (ft)	78	42	111	55	43	67	49
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 46



Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	131	127	34	99	21
Average Queue (ft)	70	56	11	50	1
95th Queue (ft)	114	93	35	80	10
Link Distance (ft)	1196	1196		264	401
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project AM Peak  
To SR 49



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	401	493	274	587
v/c Ratio	0.77	0.50	0.67	0.58
Control Delay	36.8	25.0	35.2	8.6
Queue Delay	0.0	1.1	0.0	0.0
Total Delay	36.8	26.1	35.2	8.6
Queue Length 50th (ft)	165	97	117	91
Queue Length 95th (ft)	#341	172	212	192
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	688	1311	659	1001
Starvation Cap Reductn	0	558	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.65	0.42	0.59

Intersection Summary

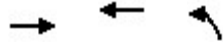
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues

Cumulative plus Project AM Peak

7: Railroad Ave & Idaho Maryland Rd

To SR 49



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	908	440	120
v/c Ratio	0.64	0.53	0.42
Control Delay	16.5	24.1	29.4
Queue Delay	0.2	0.0	0.0
Total Delay	16.7	24.1	29.4
Queue Length 50th (ft)	131	75	35
Queue Length 95th (ft)	223	141	99
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2447	1826	359
Starvation Cap Reductn	692	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.52	0.24	0.33

Intersection Summary

Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project AM Peak  
To SR 49



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	10	207	207	184	279	557	48	503
v/c Ratio	0.05	0.37	0.58	0.37	0.66	0.63	0.25	0.55
Control Delay	30.7	4.5	31.3	4.4	33.3	19.6	32.6	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	4.5	31.3	4.4	33.3	19.6	32.6	22.5
Queue Length 50th (ft)	3	0	67	0	90	162	16	79
Queue Length 95th (ft)	19	24	163	30	#262	#410	55	157
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	317	583	465	577	454	1030	210	1475
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.36	0.45	0.32	0.61	0.54	0.23	0.34

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
19: Centennial Dr & Idaho Maryland Rd

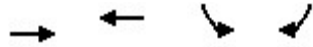
Cumulative plus Project AM Peak  
To SR 49



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	249	354	24	258	93
v/c Ratio	0.18	0.28	0.04	0.18	0.13
Control Delay	6.3	2.2	13.9	3.6	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	2.2	13.9	3.6	10.6
Queue Length 50th (ft)	0	0	0	0	1
Queue Length 95th (ft)	97	41	23	54	52
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1695	1472	765	1801	1329
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.03	0.14	0.07
<b>Intersection Summary</b>					

Queues  
20: Idaho Maryland Rd & Sutton Way

Cumulative plus Project AM Peak  
To SR 49









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	266	320	54	132
v/c Ratio	0.46	0.53	0.16	0.32
Control Delay	18.5	16.0	21.9	7.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.5	16.0	21.9	7.8
Queue Length 50th (ft)	59	56	13	0
Queue Length 95th (ft)	146	149	47	41
Internal Link Dist (ft)	481	1255	1069	
Turn Bay Length (ft)				70
Base Capacity (vph)	969	959	773	766
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.33	0.07	0.17
<b>Intersection Summary</b>				



Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project AM Peak  
To SR 49

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	64	212	707	161	322	341
v/c Ratio	0.31	0.34	0.84	0.20	0.75	0.22
Control Delay	33.4	9.3	30.9	3.6	36.9	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	9.3	30.9	3.6	36.9	3.1
Queue Length 50th (ft)	27	32	299	0	132	37
Queue Length 95th (ft)	63	72	#559	35	#254	75
Internal Link Dist (ft)	1215		1008			673
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	375	702	845	804	529	1521
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.30	0.84	0.20	0.61	0.22

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	110	384	127	94
Average Queue (ft)	75	171	55	36
95th Queue (ft)	116	332	108	76
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	7			
Queuing Penalty (veh)	22			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	120	114	167	127	110
Average Queue (ft)	59	40	80	78	55
95th Queue (ft)	105	88	141	123	99
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			6	1
Queuing Penalty (veh)	0			10	2
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	7		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	T
Maximum Queue (ft)	61	110	115	135	10	130	126	122	131	125
Average Queue (ft)	25	51	57	53	0	62	42	35	70	53
95th Queue (ft)	55	93	100	106	5	108	84	86	118	105
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)				0						
Queuing Penalty (veh)				0						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						1	0			
Queuing Penalty (veh)						1	0			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	154	176	102	176	169	62	105	202	223	85	92
Average Queue (ft)	59	87	60	62	82	20	48	102	136	29	41
95th Queue (ft)	124	161	103	141	159	52	83	181	198	68	74
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	1	2	3	4						
Queuing Penalty (veh)	0	2	0	9	12						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	3		0	0	0	0		
Queuing Penalty (veh)			4	3		0	0	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	110	126	92	118	210	222	401
Average Queue (ft)	33	38	22	33	146	143	78
95th Queue (ft)	81	94	69	95	220	230	291
Link Distance (ft)	456	456	327	327	138	138	890
Upstream Blk Time (%)					20	13	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	86	104	147	160	160	126	160	234	98	150	102	76
Average Queue (ft)	34	56	73	87	76	61	81	125	23	72	41	32
95th Queue (ft)	71	90	124	134	130	106	137	205	60	122	84	65
Link Distance (ft)			327	327			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280			280
Storage Blk Time (%)						0	1					
Queuing Penalty (veh)						1	2					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	75
Average Queue (ft)	32
95th Queue (ft)	65
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	121	192	62	87	95	158	272	224
Average Queue (ft)	48	110	18	39	47	31	128	70
95th Queue (ft)	95	177	49	71	83	89	217	146
Link Distance (ft)	211	211		1558	1558		800	
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)				0			0	0
Queuing Penalty (veh)				0			2	0

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	208	130	132	127	130	121	96
Average Queue (ft)	95	28	54	56	53	57	44
95th Queue (ft)	167	72	104	108	109	103	76
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	1	0					
Queuing Penalty (veh)	1	0					

Zone Summary

Zone wide Queuing Penalty: 80

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	211	180	37	99	50
Average Queue (ft)	107	84	13	51	8
95th Queue (ft)	179	149	38	84	30
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

Cumulative plus Project PM Peak  
To SR 49



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	339	1022	167	296
v/c Ratio	0.73	0.79	0.54	0.28
Control Delay	33.3	27.2	34.1	2.0
Queue Delay	0.0	50.5	0.0	0.0
Total Delay	33.3	77.7	34.1	2.0
Queue Length 50th (ft)	128	197	65	3
Queue Length 95th (ft)	230	#396	134	35
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	679	1299	652	1075
Starvation Cap Reductn	0	569	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	1.40	0.26	0.28

Intersection Summary

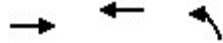
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

## Queues

Cumulative plus Project PM Peak

## 7: Railroad Ave &amp; Idaho Maryland Rd

To SR 49



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	679	960	164
v/c Ratio	0.68	0.74	0.65
Control Delay	24.1	23.6	40.5
Queue Delay	0.1	0.0	0.0
Total Delay	24.2	23.6	40.5
Queue Length 50th (ft)	126	177	60
Queue Length 95th (ft)	170	266	#146
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2122	1350	259
Starvation Cap Reductn	504	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.42	0.71	0.63

## Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project PM Peak  
To SR 49



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	76	262	64	109	281	713	152	566
v/c Ratio	0.36	0.40	0.31	0.28	0.79	0.84	0.86	0.45
Control Delay	37.3	3.6	36.0	1.8	48.4	32.4	79.8	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	3.6	36.0	1.8	48.4	32.4	79.8	22.0
Queue Length 50th (ft)	34	0	29	0	130	308	74	113
Queue Length 95th (ft)	76	29	66	0	#275	#579	#196	174
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	264	664	390	521	379	856	176	1262
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.39	0.16	0.21	0.74	0.83	0.86	0.45

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
19: Centennial Dr & Idaho Maryland Rd

Cumulative plus Project PM Peak  
To SR 49



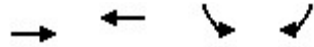
Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	435	183	16	513	461
v/c Ratio	0.60	0.25	0.06	0.65	0.73
Control Delay	15.0	3.0	22.2	13.5	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	3.0	22.2	13.5	26.2
Queue Length 50th (ft)	74	0	3	92	86
Queue Length 95th (ft)	166	22	20	124	#322
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1313	1169	300	1713	631
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.16	0.05	0.30	0.73

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
20: Idaho Maryland Rd & Sutton Way

Cumulative plus Project PM Peak  
To SR 49









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	452	363	192	271
v/c Ratio	0.82	0.74	0.57	0.52
Control Delay	35.6	29.3	30.8	7.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.6	29.3	30.8	7.5
Queue Length 50th (ft)	155	114	68	0
Queue Length 95th (ft)	#309	194	123	46
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	624	639	461	613
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.72	0.57	0.42	0.44

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project PM Peak  
To SR 49

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	171	395	511	52	143	682
v/c Ratio	0.51	0.54	0.73	0.08	0.43	0.53
Control Delay	31.2	9.9	24.2	5.1	29.3	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	9.9	24.2	5.1	29.3	7.8
Queue Length 50th (ft)	58	48	160	0	49	125
Queue Length 95th (ft)	136	130	316	20	110	223
Internal Link Dist (ft)	1251		1006			653
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	463	986	1045	910	654	1585
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.40	0.49	0.06	0.22	0.43
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	113	523	166	166
Average Queue (ft)	84	208	69	59
95th Queue (ft)	118	451	135	120
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	16			
Queuing Penalty (veh)	47			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	146	110	236	133	120
Average Queue (ft)	89	33	90	99	81
95th Queue (ft)	148	85	166	137	124
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			20	7
Queuing Penalty (veh)	6			38	15
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	5		
Queuing Penalty (veh)		0	11		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	52	128	132	166	39	254	139	220	235	169
Average Queue (ft)	21	61	61	91	3	103	80	83	128	64
95th Queue (ft)	49	107	109	162	21	199	143	182	209	129
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	1						
Queuing Penalty (veh)		0	0	1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						5	3	0		
Queuing Penalty (veh)						11	7	0		

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	180	198	102	171	184	107	195	208	227	104	113
Average Queue (ft)	110	150	63	61	104	30	92	113	140	36	45
95th Queue (ft)	192	211	103	139	182	77	161	193	203	80	84
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	10	1	3	8						
Queuing Penalty (veh)	5	39	0	13	30						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	3		0	8	0	0		
Queuing Penalty (veh)			5	4		1	2	0	0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	161	178	210	296	242	217	234	475
Average Queue (ft)	58	67	72	100	10	138	180	118
95th Queue (ft)	124	140	174	228	93	216	261	373
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	12	30	
Queuing Penalty (veh)				0	0	0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	152	168	215	234	266	206	317	394	340	670	340	144
Average Queue (ft)	63	83	116	124	130	113	143	233	207	322	172	63
95th Queue (ft)	117	135	188	197	218	190	254	345	369	604	348	119
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)				0	0							
Queuing Penalty (veh)				0	0							
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)			0	0	1	9	9		0	15	0	
Queuing Penalty (veh)			0	1	2	28	16		2	86	2	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	156	11
Average Queue (ft)	71	0
95th Queue (ft)	130	11
Link Distance (ft)	229	229
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	202	187	159	205	166	141	144	121
Average Queue (ft)	95	85	91	69	63	60	68	54
95th Queue (ft)	174	164	157	144	131	112	121	97
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)	0	0						
Queuing Penalty (veh)	1	1						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			2	0				
Queuing Penalty (veh)			5	0				

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	611	180	238	115	123	199	72
Average Queue (ft)	255	136	174	45	43	101	35
95th Queue (ft)	537	225	259	99	101	168	61
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			5				
Queuing Penalty (veh)			14				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	16	1					
Queuing Penalty (veh)	59	6					

Zone Summary

Zone wide Queuing Penalty: 460



Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB
Directions Served	LT	TR	L	T
Maximum Queue (ft)	64	65	31	61
Average Queue (ft)	37	25	6	32
95th Queue (ft)	55	51	26	47
Link Distance (ft)	1196	1196		263
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			100	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

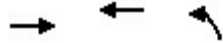
Cumulative plus Project 0630 AM  
To SR 49



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	249	262	129	461
v/c Ratio	0.33	0.19	0.20	0.40
Control Delay	17.3	15.6	19.7	2.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.3	15.6	19.7	2.8
Queue Length 50th (ft)	55	30	30	10
Queue Length 95th (ft)	140	68	87	51
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	1130	2145	1082	1170
Starvation Cap Reductn	0	286	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.14	0.12	0.39
<b>Intersection Summary</b>				

Queues  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
To SR 49



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	711	250	57
v/c Ratio	0.53	0.31	0.18
Control Delay	12.5	17.9	19.4
Queue Delay	0.0	0.0	0.0
Total Delay	12.5	17.9	19.4
Queue Length 50th (ft)	75	30	12
Queue Length 95th (ft)	136	69	44
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	3022	2276	470
Starvation Cap Reductn	534	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.29	0.11	0.12
<b>Intersection Summary</b>			

Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project 0630 AM  
To SR 49



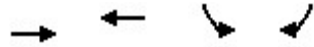
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	160	134	97	149	283	14	335
v/c Ratio	0.02	0.32	0.35	0.19	0.38	0.26	0.06	0.40
Control Delay	24.8	4.3	22.2	0.8	22.2	10.7	24.6	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	4.3	22.2	0.8	22.2	10.7	24.6	19.0
Queue Length 50th (ft)	1	0	29	0	32	31	3	37
Queue Length 95th (ft)	12	17	99	0	108	165	22	105
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	450	702	658	723	644	1358	298	2097
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.23	0.20	0.13	0.23	0.21	0.05	0.16
<b>Intersection Summary</b>								



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	191	273	8	162	50
v/c Ratio	0.13	0.21	0.01	0.10	0.07
Control Delay	4.6	2.0	10.1	1.8	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	2.0	10.1	1.8	8.0
Queue Length 50th (ft)	0	0	0	0	0
Queue Length 95th (ft)	70	35	10	31	29
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1755	1507	851	1859	1533
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.18	0.01	0.09	0.03
<b>Intersection Summary</b>					

Queues  
 20: Idaho Maryland Rd & Sutton Way

Cumulative plus Project 0630 AM  
 To SR 49









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	177	189	35	59
v/c Ratio	0.32	0.34	0.09	0.15
Control Delay	14.3	12.0	16.4	7.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.3	12.0	16.4	7.3
Queue Length 50th (ft)	31	25	6	0
Queue Length 95th (ft)	81	74	27	23
Internal Link Dist (ft)	481	1255	1954	
Turn Bay Length (ft)				70
Base Capacity (vph)	1190	1161	899	833
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.15	0.16	0.04	0.07

Intersection Summary

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 0630 AM  
To SR 49

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	33	86	370	138	227	212
v/c Ratio	0.10	0.13	0.50	0.20	0.41	0.15
Control Delay	24.0	3.3	15.7	4.0	18.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	3.3	15.7	4.0	18.7	2.3
Queue Length 50th (ft)	5	0	50	0	32	0
Queue Length 95th (ft)	38	21	203	32	146	40
Internal Link Dist (ft)	1189		984			663
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	792	1033	1385	1209	984	1707
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.08	0.27	0.11	0.23	0.12
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	97	153	65	56
Average Queue (ft)	40	64	20	17
95th Queue (ft)	86	116	50	42
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	1			
Queuing Penalty (veh)	2			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	102	57	92	86	71
Average Queue (ft)	46	18	37	39	30
95th Queue (ft)	84	46	76	69	61
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	0			0	0
Queuing Penalty (veh)	0			0	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	45	46	55	76	25	66	49	50	80	51
Average Queue (ft)	11	18	20	25	3	27	17	9	36	14
95th Queue (ft)	36	39	47	55	17	57	43	33	66	38
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)										
Queuing Penalty (veh)										



Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	71	90	78	78	91	32	34	148	163	64	62
Average Queue (ft)	10	23	28	14	26	5	8	44	88	13	23
95th Queue (ft)	40	62	65	52	71	22	30	108	144	42	50
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)			0	0	0						
Queuing Penalty (veh)			0	0	0						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			0	0							
Queuing Penalty (veh)			0	0							

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	<	R	T
Maximum Queue (ft)	26	32	18	28	175	127	26
Average Queue (ft)	2	3	1	2	84	58	1
95th Queue (ft)	14	17	8	13	153	94	12
Link Distance (ft)	456	456	327	327	138	138	890
Upstream Blk Time (%)					4	0	
Queuing Penalty (veh)					0	0	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	48	68	79	92	60	53	81	115	32	63	50	41
Average Queue (ft)	12	31	21	44	23	21	32	50	3	29	15	13
95th Queue (ft)	38	60	58	82	50	47	64	94	18	56	38	39
Link Distance (ft)			327	327			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	33
Average Queue (ft)	5
95th Queue (ft)	25
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	74	118	48	67	48	64	122	77
Average Queue (ft)	30	50	11	31	14	18	57	34
95th Queue (ft)	63	95	36	57	35	50	101	60
Link Distance (ft)	211	211		1417	1417		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	106	54	90	82	88	42	63
Average Queue (ft)	40	18	37	25	16	13	30
95th Queue (ft)	83	42	76	62	57	38	52
Link Distance (ft)	1539		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Zone Summary

Zone wide Queuing Penalty: 3



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	660	21	151	530
v/c Ratio	0.57	0.09	0.18	0.69
Control Delay	14.9	25.1	8.7	18.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.9	25.1	8.7	18.8
Queue Length 50th (ft)	63	5	22	90
Queue Length 95th (ft)	160	28	61	#362
Internal Link Dist (ft)	1150		216	362
Turn Bay Length (ft)		100		
Base Capacity (vph)	1963	416	1574	1041
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.34	0.05	0.10	0.51

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Queues  
4: E. Bennett St & Hansen Way

MITIG8 Cumulative plus Project 1530 PM  
To SR 49



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	483	298	183	391
v/c Ratio	0.49	0.57	0.44	0.41
Control Delay	18.5	16.6	23.4	8.7
Queue Delay	0.0	0.0	0.0	0.1
Total Delay	18.5	16.6	23.4	8.8
Queue Length 50th (ft)	62	48	47	57
Queue Length 95th (ft)	130	135	124	130
Internal Link Dist (ft)	170	436		216
Turn Bay Length (ft)			100	
Base Capacity (vph)	2018	1027	616	1624
Starvation Cap Reductn	0	0	0	377
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.24	0.29	0.30	0.31

Intersection Summary

Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

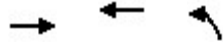


Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	417	798	191	276
v/c Ratio	0.77	0.71	0.58	0.28
Control Delay	35.0	26.7	35.7	3.4
Queue Delay	0.0	51.6	0.0	0.0
Total Delay	35.0	78.3	35.7	3.4
Queue Length 50th (ft)	173	166	83	14
Queue Length 95th (ft)	#325	266	151	48
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	673	1286	646	985
Starvation Cap Reductn	0	580	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	1.13	0.30	0.28

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
7: Railroad Ave & Idaho Maryland Rd



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	645	743	197
v/c Ratio	0.63	0.67	0.68
Control Delay	21.0	21.8	39.2
Queue Delay	0.1	0.0	0.0
Total Delay	21.0	21.8	39.2
Queue Length 50th (ft)	100	124	63
Queue Length 95th (ft)	166	200	#189
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	2344	1496	289
Starvation Cap Reductn	506	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.35	0.50	0.68

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	72	231	67	73	203	702	146	533
v/c Ratio	0.33	0.39	0.31	0.19	0.65	0.84	0.82	0.40
Control Delay	36.9	3.8	36.0	1.1	40.3	32.1	71.8	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	3.8	36.0	1.1	40.3	32.1	71.8	20.9
Queue Length 50th (ft)	32	0	30	0	90	300	71	103
Queue Length 95th (ft)	74	28	68	0	166	#569	#188	164
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	270	647	397	526	386	873	179	1336
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.36	0.17	0.14	0.53	0.80	0.82	0.40

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



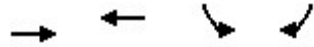


Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	350	159	14	417	401
v/c Ratio	0.54	0.24	0.05	0.58	0.59
Control Delay	14.8	3.5	20.0	12.8	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	3.5	20.0	12.8	19.5
Queue Length 50th (ft)	56	0	3	70	59
Queue Length 95th (ft)	156	29	19	117	#285
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1404	1232	321	1752	675
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.13	0.04	0.24	0.59

**Intersection Summary**

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
20: Idaho Maryland Rd & Sutton Way









Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	389	301	172	250
v/c Ratio	0.73	0.64	0.50	0.49
Control Delay	29.0	24.4	27.8	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	29.0	24.4	27.8	7.4
Queue Length 50th (ft)	114	79	53	0
Queue Length 95th (ft)	#274	168	119	53
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	685	699	507	632
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.43	0.34	0.40

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 1530 PM  
To SR 49

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	199	379	448	85	198	500
v/c Ratio	0.61	0.44	0.75	0.15	0.56	0.44
Control Delay	34.9	6.4	27.6	4.9	30.3	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	6.4	27.6	4.9	30.3	7.2
Queue Length 50th (ft)	67	29	145	0	67	84
Queue Length 95th (ft)	#178	99	283	27	147	140
Internal Link Dist (ft)	1193		1002			683
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	413	1034	932	833	583	1576
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.37	0.48	0.10	0.34	0.32

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	117	136	108	107
Average Queue (ft)	82	58	50	45
95th Queue (ft)	117	110	91	86
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	11			
Queuing Penalty (veh)	31			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	144	97	179	132	110
Average Queue (ft)	78	26	80	79	63
95th Queue (ft)	137	69	144	117	104
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			4	1
Queuing Penalty (veh)	3			5	2
Storage Bay Dist (ft)		100			
Storage Blk Time (%)		0	3		
Queuing Penalty (veh)		0	6		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	49	128	128	169	27	250	140	165	210	161
Average Queue (ft)	18	53	58	87	2	99	72	70	111	62
95th Queue (ft)	44	102	106	155	14	186	134	141	177	122
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	0						
Queuing Penalty (veh)		0	0	1						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						4	1			
Queuing Penalty (veh)						9	3			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	177	188	102	189	177	92	164	150	167	101	106
Average Queue (ft)	108	134	69	77	99	32	71	52	95	29	49
95th Queue (ft)	186	205	107	173	179	70	128	113	149	72	86
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	5	3	6	7						
Queuing Penalty (veh)	4	18	0	26	28						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			3	6		0	3		0		
Queuing Penalty (veh)			11	8		1	1		0		

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	173	190	262	339	169	213	236	576
Average Queue (ft)	79	84	81	106	15	139	187	176
95th Queue (ft)	151	162	201	251	128	225	259	589
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)			0	0	0	13	34	2
Queuing Penalty (veh)			0	1	1	0	0	0
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	146	151	210	224	262	202	320	394	340	623	340	146
Average Queue (ft)	68	86	119	129	118	107	139	232	194	290	162	58
95th Queue (ft)	120	134	184	194	208	181	262	356	348	490	337	113
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)					0							0
Queuing Penalty (veh)					0							0
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)			0	0	0	8	8		0	12	0	
Queuing Penalty (veh)			0	0	1	25	13		1	68	2	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	138
Average Queue (ft)	59
95th Queue (ft)	110
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	205	199	162	208	183	126	162	129
Average Queue (ft)	97	92	95	72	65	57	68	55
95th Queue (ft)	174	183	163	153	130	104	128	101
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)	0	1						
Queuing Penalty (veh)	1	2						
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)			3	0			0	
Queuing Penalty (veh)			7	1			0	

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	475	180	236	142	132	188	72
Average Queue (ft)	211	124	165	45	42	95	34
95th Queue (ft)	394	220	249	105	103	161	59
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			4				
Queuing Penalty (veh)			11				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	12	2					
Queuing Penalty (veh)	44	8					

Zone Summary

Zone wide Queuing Penalty: 344

Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	94	82	31	58	20
Average Queue (ft)	51	39	11	32	1
95th Queue (ft)	79	64	34	48	10
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)					
Queuing Penalty (veh)					



Queues  
6: SR 49 EB Ramps & Idaho Maryland Rd

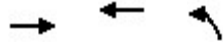
Cumulative plus Project 1830 PM  
To SR 49



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	177	362	79	139
v/c Ratio	0.30	0.31	0.16	0.16
Control Delay	15.1	13.2	17.0	1.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.1	13.2	17.0	1.8
Queue Length 50th (ft)	34	37	16	0
Queue Length 95th (ft)	87	78	52	17
Internal Link Dist (ft)	795	110	1248	
Turn Bay Length (ft)			400	
Base Capacity (vph)	1310	2534	1271	1203
Starvation Cap Reductn	0	256	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.14	0.16	0.06	0.12
<b>Intersection Summary</b>				

Queues  
7: Railroad Ave & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
To SR 49



Lane Group	EBT	WBT	NBL
Lane Group Flow (vph)	277	318	51
v/c Ratio	0.34	0.38	0.17
Control Delay	13.9	14.3	12.7
Queue Delay	0.0	0.0	0.0
Total Delay	13.9	14.3	12.7
Queue Length 50th (ft)	24	28	6
Queue Length 95th (ft)	53	60	28
Internal Link Dist (ft)	110	349	980
Turn Bay Length (ft)			
Base Capacity (vph)	3461	2328	433
Starvation Cap Reductn	73	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.08	0.14	0.12
Intersection Summary			

Queues  
12: Brunswick Rd & Idaho Maryland Rd

Cumulative plus Project 1830 PM  
To SR 49



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	38	160	45	54	100	316	109	341
v/c Ratio	0.10	0.28	0.12	0.10	0.23	0.37	0.28	0.22
Control Delay	24.0	3.1	23.6	0.4	22.0	15.9	27.1	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	3.1	23.6	0.4	22.0	15.9	27.1	16.0
Queue Length 50th (ft)	9	0	10	0	22	60	25	34
Queue Length 95th (ft)	39	19	44	0	77	174	#107	97
Internal Link Dist (ft)	1255		1856			1215		1576
Turn Bay Length (ft)					550		120	
Base Capacity (vph)	599	896	844	862	826	1371	397	2249
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.18	0.05	0.06	0.12	0.23	0.27	0.15

Intersection Summary

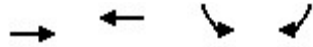
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	142	45	3	126	64
v/c Ratio	0.21	0.08	0.01	0.16	0.07
Control Delay	8.6	4.3	11.3	5.3	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	4.3	11.3	5.3	8.4
Queue Length 50th (ft)	10	0	0	9	4
Queue Length 95th (ft)	54	15	5	25	30
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1781	1516	556	1863	1289
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.03	0.01	0.07	0.05
<b>Intersection Summary</b>					

Queues  
 20: Idaho Maryland Rd & Sutton Way







Cumulative plus Project 1830 PM  
 To SR 49



Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	156	87	43	80
v/c Ratio	0.27	0.16	0.10	0.18
Control Delay	12.8	9.9	14.3	6.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.8	9.9	14.3	6.1
Queue Length 50th (ft)	27	9	8	0
Queue Length 95th (ft)	65	36	28	24
Internal Link Dist (ft)	481	1255	1385	
Turn Bay Length (ft)				70
Base Capacity (vph)	1287	1262	991	921
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.12	0.07	0.04	0.09
<b>Intersection Summary</b>				

Queues  
24: Brunswick Rd & Loma Rica Dr

Cumulative plus Project 1830 PM  
To SR 49

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	47	27	291	26	122	465
v/c Ratio	0.09	0.04	0.28	0.03	0.20	0.32
Control Delay	17.7	3.9	11.5	6.2	15.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	3.9	11.5	6.2	15.5	3.5
Queue Length 50th (ft)	6	0	33	0	16	0
Queue Length 95th (ft)	38	10	137	13	74	103
Internal Link Dist (ft)	1233		1049			653
Turn Bay Length (ft)	165			410	400	
Base Capacity (vph)	1016	1204	1488	1269	1165	1800
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.20	0.02	0.10	0.26
<b>Intersection Summary</b>						

Intersection: 1: Tinloy St /Tinloy St & Neal St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	112	178	83	83
Average Queue (ft)	80	77	33	33
95th Queue (ft)	118	144	71	68
Link Distance (ft)	93	1538	960	960
Upstream Blk Time (%)	10			
Queuing Penalty (veh)	29			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR 49 On-Ramp/Tinloy St & Auburn St

Movement	EB	WB	WB	SB	SB
Directions Served	TR	LT	T	LT	TR
Maximum Queue (ft)	143	55	119	106	99
Average Queue (ft)	73	16	49	55	43
95th Queue (ft)	129	45	97	93	83
Link Distance (ft)	135		897	99	99
Upstream Blk Time (%)	1			1	0
Queuing Penalty (veh)	2			1	0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			1		
Queuing Penalty (veh)			1		

Intersection: 8: Main St & Brunswick Rd

Movement	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LT	R	L	T	R	L	L	TR
Maximum Queue (ft)	63	76	98	96	15	131	88	118	140	89
Average Queue (ft)	23	28	37	34	1	50	34	26	67	31
95th Queue (ft)	53	58	73	73	10	99	70	74	117	66
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)			0							
Queuing Penalty (veh)			0							
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						0	0			
Queuing Penalty (veh)						0	0			

Intersection: 9: Maltman Dr/SR 49/20 WB Off-Ramp & Brunswick Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	TR	L	T	T	LT	R	L	L	T	R
Maximum Queue (ft)	145	162	99	133	124	60	102	145	162	59	56
Average Queue (ft)	40	70	52	32	47	20	50	39	85	16	29
95th Queue (ft)	99	139	89	93	103	51	83	97	140	45	52
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	1	1						
Queuing Penalty (veh)	0	1	0	1	1						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	1			0				
Queuing Penalty (veh)			1	1			0				

Intersection: 10: Brunswick Rd & SR 49/20 EB On Ramp

Movement	EB	EB	WB	WB	WB	NB	NB	B52
Directions Served	T	TR	T	T	R	<	R	T
Maximum Queue (ft)	65	87	45	69	4	197	117	43
Average Queue (ft)	12	23	5	8	0	106	57	2
95th Queue (ft)	42	63	27	40	4	179	96	25
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)						4	0	
Queuing Penalty (veh)						0	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								



Intersection: 11: Sutton Way & Brunswick Rd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	T	R	UL	T	TR	L	L	TR	L
Maximum Queue (ft)	57	80	100	98	128	94	99	154	95	160	116	61
Average Queue (ft)	16	33	40	54	55	43	44	65	29	85	44	23
95th Queue (ft)	46	62	81	88	95	79	82	116	66	139	84	54
Link Distance (ft)			334	334			1884	1884		1476		229
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	240	240			240	120			280		280	
Storage Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	78
Average Queue (ft)	30
95th Queue (ft)	65
Link Distance (ft)	229
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 22: SR 49 EB Ramps & Dorsey Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	TR	L	LT	R
Maximum Queue (ft)	102	134	79	80	50	65	77	81
Average Queue (ft)	37	50	33	33	19	22	28	36
95th Queue (ft)	75	100	66	62	41	52	60	63
Link Distance (ft)	211	211		1338	1338		800	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			140			220		220
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 23: Dorsey Dr & Sr 49 WB Ramps

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	116	69	149	63	53	84	58
Average Queue (ft)	45	20	63	25	13	36	25
95th Queue (ft)	88	49	114	57	43	69	49
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Zone Summary

Zone wide Queuing Penalty: 39

# TECHNICAL LOS APPENDIX V

FOR

## IDAHO-MARYLAND MINE PROJECT TRAFFIC IMPACT ANALYSIS

Nevada County, CA

### ROADWAY LEVEL OF SERVICE

*Prepared For:*

**Rise Grass Valley Inc.**

*Prepared By:*

**KD Anderson & Associates, Inc.**  
3853 Taylor Road, Suite G  
Loomis, CA 95650  
(916) 660-1555



April 8, 2021

*KD Anderson & Associates, Inc.*

Transportation Engineers

# **ROADWAY LEVEL OF SERVICE**

EPAP PLUS PROJECT – CENTENNIAL

EPAP PLUS PROJECT – SR 49

CUMULATIVE

CUMULATIVE PLUS PROJECT – CENTENNIAL

CUMULATIVE PLUS PROJECT – SR 49

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines and SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period		Analysis Year	2019

Project Description: *Rise Grass Valley*

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.89

No-passing zone    100%

% Trucks and Buses,  $P_T$     6%

% Recreational vehicles,  $P_R$     0%

Access points *mi*    6/mi

Analysis direction vol., $V_d$	532veh/h
Opposing direction vol., $V_o$	549veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	1.0

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.7	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.960	0.960
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.97	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	642	662
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.6 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    43.5 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 31.8 mi/h	
	Percent free flow speed, PFFS    73.0 %	

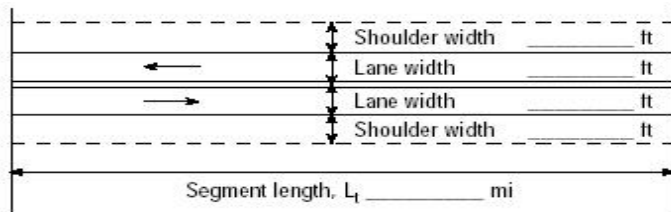
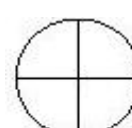
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.2	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.988	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.97	0.97
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	624	636
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	59.5	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	32.6	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	75.6	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.38

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1583
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.0
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	597.8
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.73
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines and SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.89                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    6/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	549veh/h		
Opposing direction vol., V <sub>o</sub>	532veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.7	1.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.960	0.960	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	0.97	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	662	642	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.7 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	43.5 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	31.7 mi/h
		Percent free flow speed, PFFS	72.9 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.2	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.988	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.97	0.97	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	636	624	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		59.8	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		32.6	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )		76.3	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.39		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1583
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1649
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.9
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	616.9
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.74
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period		Analysis Year	2019

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.88

No-passing zone    100%

% Trucks and Buses,  $P_T$     9%

% Recreational vehicles,  $P_R$     0%

Access points *mi*    4/mi

Analysis direction vol., $V_d$	404veh/h
Opposing direction vol., $V_o$	651veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	0.7

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.9	1.5
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.925	0.957
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.93	0.98
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	534	789

Free-Flow Speed from Field Measurement	Estimated Free-Flow Speed	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)	0.0 mi/h
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)	1.0 mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.3 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )	49.0 mi/h
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$	37.4 mi/h
	Percent free flow speed, PFFS	76.4 %

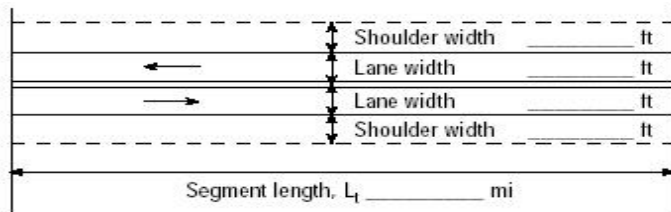
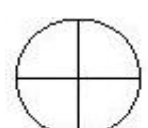
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.4	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.965	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.94	0.99
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	506	747
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	55.0	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	29.8	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	67.0	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	C
Volume to capacity ratio, $v/c$	0.31

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1594
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	76.4
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	459.1
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.65
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> <div style="width: 50%;">                     Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                      Grade Length    mi    Up/down                      Peak-hour factor, PHF    0.88                      No-passing zone    100%                      % Trucks and Buses, P<sub>T</sub>    9%                      % Recreational vehicles, P<sub>R</sub>    0%                      Access points mi    4/mi                 </div> </div> <div style="text-align: center; margin-top: 10px;">                       Show North Arrow                 </div>	
Analysis direction vol., V <sub>d</sub>	651veh/h		
Opposing direction vol., V <sub>o</sub>	404veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.5	1.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.957	0.925	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	0.93	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	789	534	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.0 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.2 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	49.0 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	36.6 mi/h
		Percent free flow speed, PFFS	74.7 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.965	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.99	0.94	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	747	506	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		64.8	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		29.8	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> (v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		82.6	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.46		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1507
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1603
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	739.8
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.90
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd EB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.79

No-passing zone    100%

% Trucks and Buses,  $P_T$     6%

% Recreational vehicles,  $P_R$     2%

Access points *mi*    3/mi

Analysis direction vol., $V_d$	62veh/h
Opposing direction vol., $V_o$	91veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	0.1

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	2.7	2.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.906	0.911
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.67	0.68
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	129	186
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    0.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    3.8 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    41.7 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 35.4 mi/h	
	Percent free flow speed, PFFS    85.1 %	

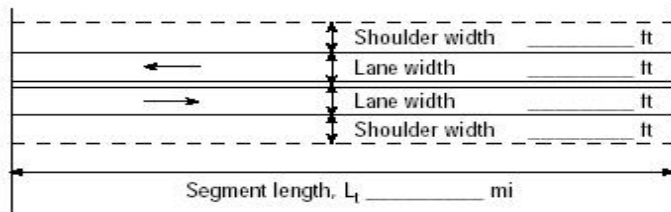
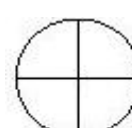
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.9	1.8
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.949	0.954
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.73	0.74
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	113	163
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	13.0	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	54.7	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	35.4	

**Level of Service and Other Performance Measures**

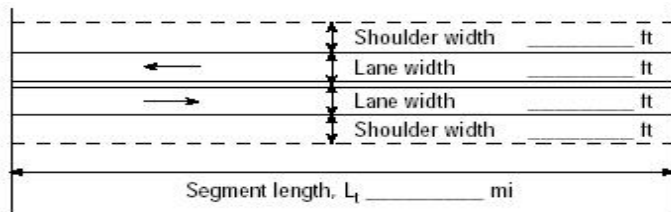
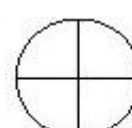
Level of service, LOS (Exhibit 15-3)	B
Volume to capacity ratio, $v/c$	0.08

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1127
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1249
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	85.1
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	78.5
Effective width, $W_v$ (Eq. 15-29) ft	23.66
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.77
Bicycle level of service (Exhibit 15-4)	C
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

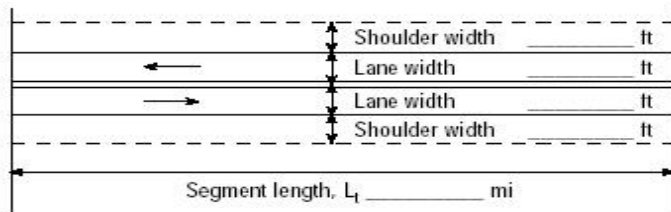
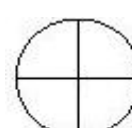
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd WB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period		Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.79                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    2%                  Access points mi    3/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	91veh/h		
Opposing direction vol., V <sub>o</sub>	62veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.6	2.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.911	0.906	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.68	0.67	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	186	129	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.8 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.9 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	41.7 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	36.3 mi/h
		Percent free flow speed, PFFS	87.3 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.8	1.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.949	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.74	0.73	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	163	113	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		18.0	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		54.7	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )		50.3	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.11		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1053
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1200
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	87.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	115.2
Effective width, $W_v$ (Eq. 15-29) ft	21.63
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.43
Bicycle level of service (Exhibit 15-4)	C
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

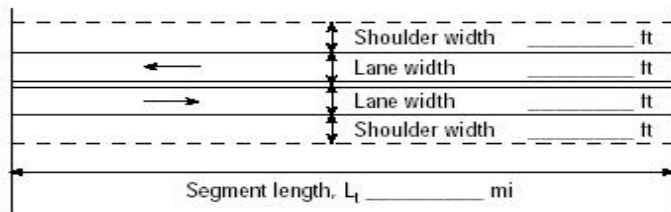
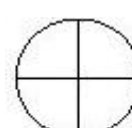


<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period		Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> </div> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.40 mi    Up/down 5.0</p> <p>Peak-hour factor, PHF 0.87</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 2/mi</p>	
Analysis direction vol., V <sub>d</sub>	354veh/h		
Opposing direction vol., V <sub>o</sub>	525veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	5.0	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.807	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.84	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	600	607	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.8 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	35.7 mi/h
		Percent free flow speed, PFFS	76.2 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	407	603	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		45.7	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		36.5	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		60.4	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.35		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1364
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1693
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	76.2
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	406.9
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.43
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway</p> <p>highway <input checked="" type="checkbox"/> Class III highway</p> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.40 mi    Up/down -5.0</p> <p>Peak-hour factor, PHF 0.87</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 2/mi</p> </div> <div style="width: 45%; text-align: center;">  <p>Show North Arrow</p> </div> </div>	
Analysis direction vol., V <sub>d</sub>	525veh/h		
Opposing direction vol., V <sub>o</sub>	354veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.1	5.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.994	0.807	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	0.84	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	607	600	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.8 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	35.7 mi/h
		Percent free flow speed, PFFS	76.1 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	603	407	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		55.1	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		36.5	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )		76.9	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.36		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1670
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	76.1
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	603.4
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.63
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.80                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    10/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	354veh/h		
Opposing direction vol., V <sub>o</sub>	526veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.9	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.949	0.965	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.92	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	507	695	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	44.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.1 mi/h
		Percent free flow speed, PFFS	75.9 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.4	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.977	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.93	0.98	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	487	671	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )		52.5	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		33.0	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )		66.4	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.30		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.9
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	442.5
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.47
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period		Analysis Year	2019

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.80  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     6%  
 % Recreational vehicles,  $P_R$     0%  
 Access points *mi*    10/mi

Show North Arrow

Analysis direction vol., $V_d$	526veh/h
Opposing direction vol., $V_o$	354veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	0.7

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.6	1.9
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.965	0.949
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.98	0.92
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	695	507

Free-Flow Speed from Field Measurement	Estimated Free-Flow Speed	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)	2.6 mi/h
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    2.2 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )	44.9 mi/h
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$	33.4 mi/h
	Percent free flow speed, PFFS	74.3 %

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.4
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.977
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.98	0.93
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	671	487
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	61.1	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	33.0	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	80.2	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.41

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1524
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1577
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	657.5
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.67
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	SR 174 EB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.86  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     8 %  
 % Recreational vehicles,  $P_R$     0%  
 Access points  $mi$     8/mi

Show North Arrow

Analysis direction vol., $V_d$	289veh/h
Opposing direction vol., $V_o$	527veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	2.1

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	2.1	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.919	0.947
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.86	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	425	667
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    2.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.6 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    40.4 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 30.3 mi/h	
	Percent free flow speed, PFFS    75.1 %	

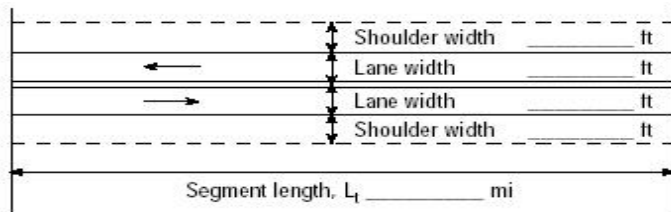
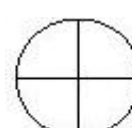
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.6	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.954	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.87	0.97
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	405	632
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	46.6	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	33.3	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	59.6	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	E
Volume to capacity ratio, $v/c$	0.25

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1562
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.1
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	336.0
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.02
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 WB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div style="width: 80%;"> <input checked="" type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.86                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    8 %                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points <i>mi</i>    8/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	527veh/h		
Opposing direction vol., V <sub>o</sub>	289veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.7	2.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.947	0.919	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	0.86	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	667	425	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.0 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    2.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    40.4 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 29.3 mi/h		
	Percent free flow speed, PFFS    72.6 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.97	0.87	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	632	405	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	56.9		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	33.3		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	77.2		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.39		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1417
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1483
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.6
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	612.8
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.33
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines and SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.89  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     6%  
 % Recreational vehicles,  $P_R$     0%  
 Access points  $mi$     6/mi

Show North Arrow

Analysis direction vol., $V_d$	548veh/h
Opposing direction vol., $V_o$	567veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	1.0

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.7	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.960	0.960
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.97	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	661	684
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.5 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    43.5 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 31.5 mi/h	
	Percent free flow speed, PFFS    72.4 %	

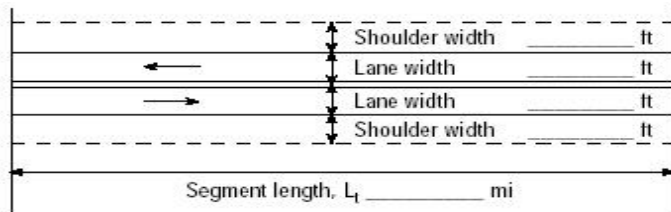
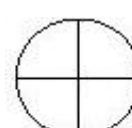
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.97	0.98
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	635	650
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	60.6	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	31.9	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	76.4	

**Level of Service and Other Performance Measures**

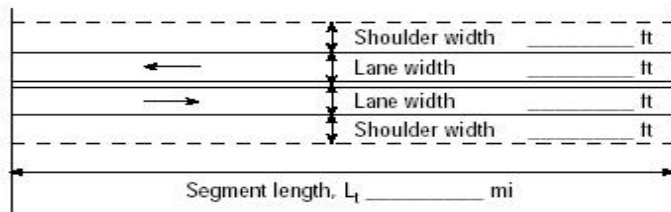
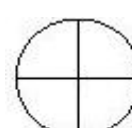
Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.39

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1599
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.4
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	615.7
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.74
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

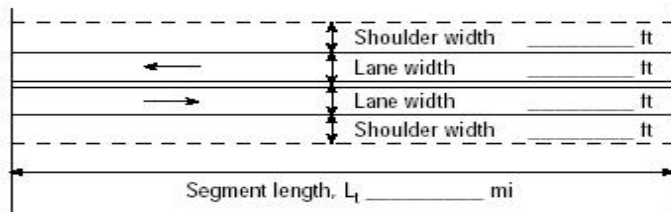
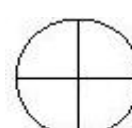
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines and SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.89                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    6/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	567veh/h		
Opposing direction vol., V <sub>o</sub>	548veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.7	1.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.960	0.960	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	0.97	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	684	661	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	43.5 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	31.4 mi/h
		Percent free flow speed, PFFS	72.3 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.98	0.97	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	650	635	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	61.0		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	31.9		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )	77.1		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.40		



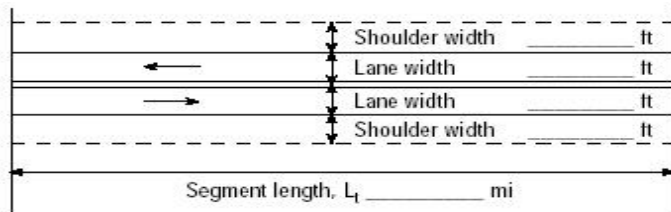
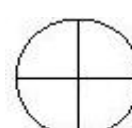
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1583
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	637.1
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.76
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p><input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway</p> <p>highway <input checked="" type="checkbox"/> Class III highway</p> <p>Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling</p> <p>Grade Length    mi    Up/down</p> <p>Peak-hour factor, PHF    0.88</p> <p>No-passing zone    100%</p> <p>% Trucks and Buses, P<sub>T</sub>    9%</p> <p>% Recreational vehicles, P<sub>R</sub>    0%</p> <p>Access points mi    4/mi</p> </div> <div style="width: 50%; text-align: center;">  <p>Show North Arrow</p> </div> </div>	
Analysis direction vol., V <sub>d</sub>	425veh/h		
Opposing direction vol., V <sub>o</sub>	679veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.8	1.5	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.933	0.957	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.94	0.99	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	551	814	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    0.0 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    1.0 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.3 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    49.0 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 37.1 mi/h		
	Percent free flow speed, PFFS    75.8 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.4	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.965	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.95	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	527	772	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	56.0		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	28.9		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )	67.7		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.32		

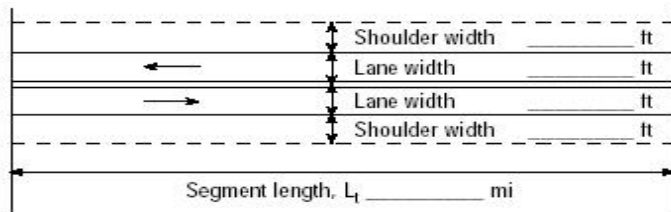
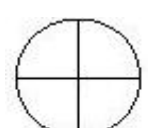
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1611
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	483.0
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.68
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.88                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    9 %                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    4/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	679veh/h		
Opposing direction vol., V <sub>o</sub>	425veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.5	1.8	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.957	0.933	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.99	0.94	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	814	551	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.0 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.1 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	49.0 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	36.3 mi/h
		Percent free flow speed, PFFS	74.1 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.965	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	0.95	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	772	527	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		65.7	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		28.9	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> (v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		82.9	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.48		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1523
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1603
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.1
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	771.6
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.92
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

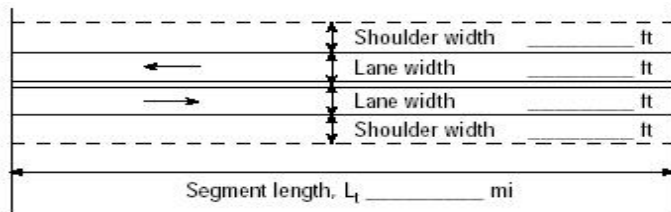
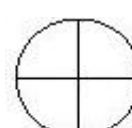
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd EB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.79                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    2%                  Access points mi    3/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	68veh/h		
Opposing direction vol., V <sub>o</sub>	104veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.7	2.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.906	0.911	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.67	0.70	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	142	206	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.8 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	4.0 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	41.7 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	35.0 mi/h
		Percent free flow speed, PFFS	84.0 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.9	1.8	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.949	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.73	0.75	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	124	184	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		14.1	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		54.7	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		36.1	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.08		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1159
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1281
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	84.0
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	86.1
Effective width, $W_v$ (Eq. 15-29) ft	23.24
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.92
Bicycle level of service (Exhibit 15-4)	C
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

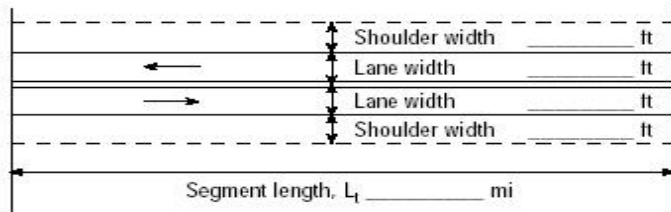
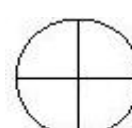
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd WB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.79                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    2%                  Access points mi    3/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	104veh/h		
Opposing direction vol., V <sub>o</sub>	68veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.6	2.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.911	0.906	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.70	0.67	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	206	142	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.8 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	3.1 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	41.7 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	35.9 mi/h
		Percent free flow speed, PFFS	86.1 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.8	1.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.949	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.75	0.73	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	184	124	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		20.0	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		54.7	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> (v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		52.7	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.12		



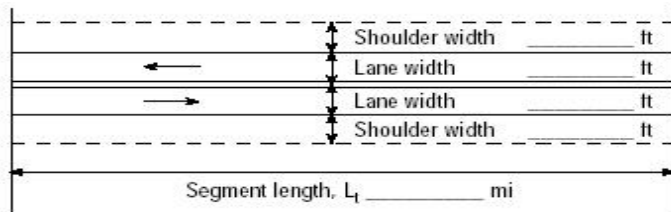
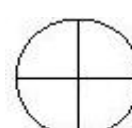
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1069
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1217
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	86.1
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	131.6
Effective width, $W_v$ (Eq. 15-29) ft	20.72
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.69
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> </div> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.40 mi    Up/down 5.0</p> <p>Peak-hour factor, PHF 0.87</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 2/mi</p>	
Analysis direction vol., V <sub>d</sub>	365veh/h		
Opposing direction vol., V <sub>o</sub>	537veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	4.9	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.809	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.85	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	610	621	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.8 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	35.6 mi/h
		Percent free flow speed, PFFS	75.8 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	420	617	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		47.2	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		35.9	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		61.7	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.36		

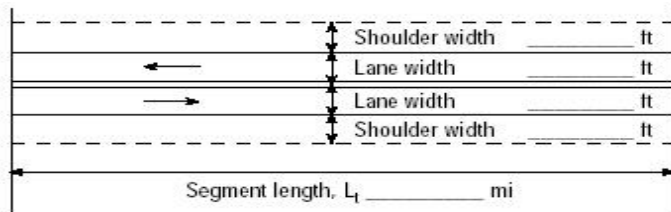

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1364
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1693
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	419.5
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.45
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway</p> <p>highway <input checked="" type="checkbox"/> Class III highway</p> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.40 mi    Up/down -5.0</p> <p>Peak-hour factor, PHF 0.87</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 2/mi</p> </div> <div style="width: 45%; text-align: center;">  <p>Show North Arrow</p> </div> </div>	
Analysis direction vol., V <sub>d</sub>	537veh/h		
Opposing direction vol., V <sub>o</sub>	365veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.1	4.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.994	0.809	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	0.85	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	621	610	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.8 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	35.5 mi/h
		Percent free flow speed, PFFS	75.8 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	617	420	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		56.7	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		35.9	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		78.1	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.37		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1670
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	617.2
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.64
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

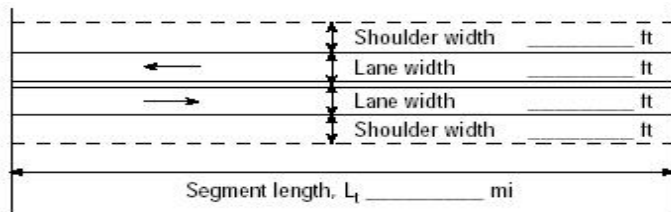
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.80                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    10/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	365veh/h		
Opposing direction vol., V <sub>o</sub>	537veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.9	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.949	0.965	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.93	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	517	710	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.5 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    44.9 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 33.9 mi/h		
	Percent free flow speed, PFFS    75.5 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.4	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.977	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.93	0.98	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	502	685	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	53.7		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	32.4		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	67.4		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.30		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	456.3
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.49
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

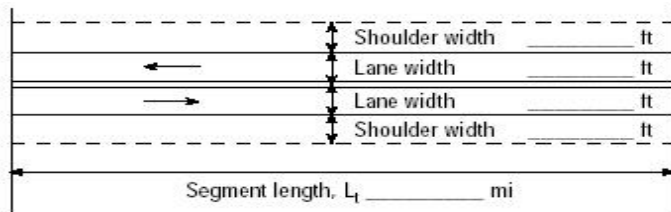
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.80                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    10/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	537veh/h		
Opposing direction vol., V <sub>o</sub>	365veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.6	1.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.965	0.949	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	0.93	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	710	517	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.2 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	44.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	33.2 mi/h
		Percent free flow speed, PFFS	74.0 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.977	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.98	0.93	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	685	502	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	62.2		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	32.4		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> (v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )	80.9		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.42		



Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1541
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1613
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.0
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	671.3
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.68
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 EB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<input checked="" type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input checked="" type="checkbox"/> Rolling Grade Length    mi    Up/down Peak-hour factor, PHF    0.86 No-passing zone    100% % Trucks and Buses, P <sub>T</sub> 8 % % Recreational vehicles, P <sub>R</sub> 0% Access points <i>mi</i> 8/mi	
Analysis direction vol., V <sub>d</sub>	292veh/h		
Opposing direction vol., V <sub>o</sub>	529veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.1	1.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.919	0.947	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.86	0.97	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> / (PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	430	670	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.0 mi/h	
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.6 mi/h		Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    40.4 mi/h	
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 30.3 mi/h	
		Percent free flow speed, PFFS    74.9 %	
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.6	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.87	0.97	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	409	634	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )		46.8	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		33.2	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )		59.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)		E	
Volume to capacity ratio, v/c		0.25	

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1562
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.9
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	339.5
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.03
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 WB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<input checked="" type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input checked="" type="checkbox"/> Rolling Grade Length    mi    Up/down Peak-hour factor, PHF    0.86 No-passing zone    100% % Trucks and Buses, P <sub>T</sub> 8 % % Recreational vehicles, P <sub>R</sub> 0% Access points mi    8/mi	
Analysis direction vol., V <sub>d</sub>	529veh/h		
Opposing direction vol., V <sub>o</sub>	292veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.7	2.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.947	0.919	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	0.86	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	670	430	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.0 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    2.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    40.4 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 29.3 mi/h		
	Percent free flow speed, PFFS    72.5 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.97	0.87	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	634	409	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	56.7		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	33.2		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )	76.9		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.39		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1417
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1499
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	615.1
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.33
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines and SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.89  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     6%  
 % Recreational vehicles,  $P_R$     0%  
 Access points *mi*    6/mi

Show North Arrow

Analysis direction vol., $V_d$	575veh/h	Opposing direction vol., $V_o$	584veh/h
Shoulder width ft	6.0	Lane Width ft	12.0
Segment Length mi	1.0		

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.7	1.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.960	0.965
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.97	0.98
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	694	694
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.5 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    43.5 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 31.2 mi/h	
	Percent free flow speed, PFFS    71.7 %	

**Percent Time-Spent-Following**

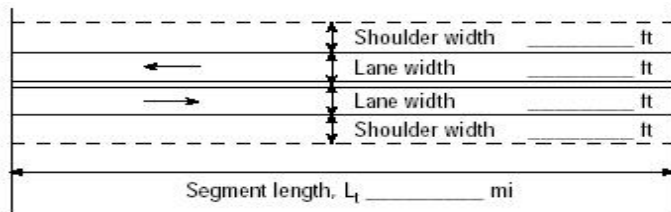
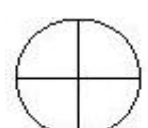
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.98	0.98
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	659	670
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	61.9	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	30.7	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	77.1	

**Level of Service and Other Performance Measures**

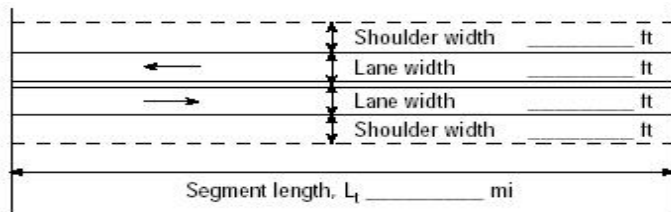
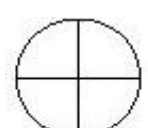
Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.41

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	71.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	646.1
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.77
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines and SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.89                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    6/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	584veh/h		
Opposing direction vol., V <sub>o</sub>	575veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.6	1.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.965	0.960	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	0.97	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	694	694	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    0.0 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    1.5 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    43.5 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 31.2 mi/h		
	Percent free flow speed, PFFS    71.7 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.98	0.98	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	670	659	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	62.9		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	30.7		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )	78.4		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.41		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	71.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	656.2
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.77
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway</p> <p>highway <input checked="" type="checkbox"/> Class III highway</p> <p>Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling</p> <p>Grade Length    mi    Up/down</p> <p>Peak-hour factor, PHF    0.88</p> <p>No-passing zone    100%</p> <p>% Trucks and Buses, P<sub>T</sub>    9%</p> <p>% Recreational vehicles, P<sub>R</sub>    0%</p> <p>Access points mi    4/mi</p> </div> <div style="width: 45%; text-align: center;">  <p>Show North Arrow</p> </div> </div>	
Analysis direction vol., V <sub>d</sub>	508veh/h		
Opposing direction vol., V <sub>o</sub>	736veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.7	1.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.941	0.965	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	0.99	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	632	875	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)    0.0 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    1.0 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.2 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    49.0 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub> 36.1 mi/h		
	Percent free flow speed, PFFS    73.7 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.2	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.982	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.97	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	606	836	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	61.3		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	26.7		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> (v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	72.5		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.37		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1624
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	577.3
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.77
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.88

No-passing zone    100%

% Trucks and Buses,  $P_T$     9%

% Recreational vehicles,  $P_R$     0%

Access points *mi*    4/mi

Analysis direction vol., $V_d$	736veh/h
Opposing direction vol., $V_o$	508veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	0.7

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.4	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.965	0.941
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.99	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	875	632
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.8 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    49.0 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 35.5 mi/h	
	Percent free flow speed, PFFS    72.5 %	

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.2
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.982
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	0.97
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	836	606
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	68.1	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	26.7	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	83.6	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.51

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1552
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1649
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	836.4
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.96
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd EB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length 0.25 mi    Up/down 3.0  
 Peak-hour factor, PHF 0.79  
 No-passing zone 100%  
 % Trucks and Buses,  $P_T$  6%  
 % Recreational vehicles,  $P_R$  2%  
 Access points *mi* 3/mi

Show North Arrow

Analysis direction vol., $V_d$	90veh/h		
Opposing direction vol., $V_o$	112veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	2.6	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.912	0.960
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.79	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	158	148
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS 45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8) 0.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 3.2 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ ) 41.7 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 36.1 mi/h	
	Percent free flow speed, PFFS 86.7 %	

**Percent Time-Spent-Following**

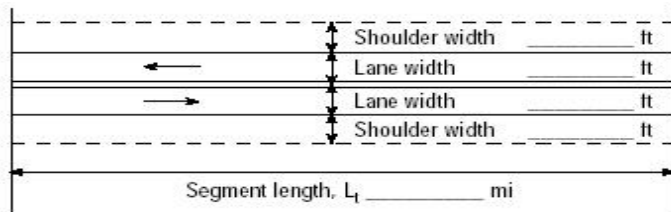
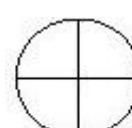
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.1
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.994
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	114	143
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	13.1	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	55.2	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	37.6	

**Level of Service and Other Performance Measures**

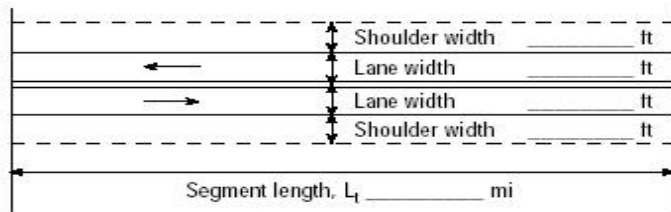
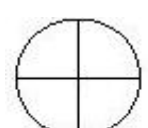
Level of service, LOS (Exhibit 15-3)	B
Volume to capacity ratio, $v/c$	0.09

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1260
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1693
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	86.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	113.9
Effective width, $W_v$ (Eq. 15-29) ft	21.70
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.41
Bicycle level of service (Exhibit 15-4)	C
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

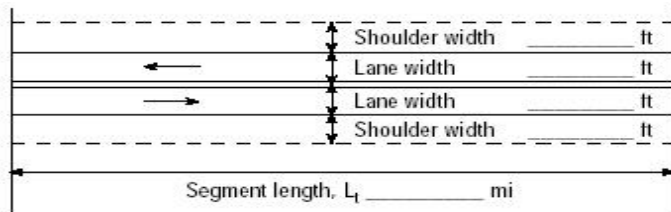
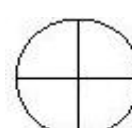


<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd WB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.79                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    2%                  Access points mi    3/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	112veh/h		
Opposing direction vol., V <sub>o</sub>	90veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.5	2.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.916	0.911	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.70	0.68	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	221	184	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.8 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	3.7 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	41.7 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.8 mi/h
		Percent free flow speed, PFFS	83.5 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.8	1.8	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.76	0.74	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	195	161	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		21.1	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		59.0	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> (v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		53.4	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.13		

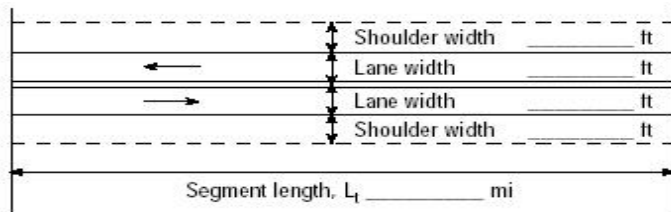
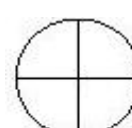
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1121
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1249
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	83.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	141.8
Effective width, $Wv$ (Eq. 15-29) ft	20.16
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.85
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
Input Data			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> <div style="width: 45%;">                     Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling                      Grade Length 0.40 mi    Up/down 5.0                      Peak-hour factor, PHF 0.87                      No-passing zone 100%                      % Trucks and Buses, P<sub>T</sub> 6%                      % Recreational vehicles, P<sub>R</sub> 0%                      Access points mi 2/mi                 </div> </div> <div style="text-align: center; margin-top: 10px;">                       Show North Arrow                 </div>	
Analysis direction vol., V <sub>d</sub>	450veh/h		
Opposing direction vol., V <sub>o</sub>	601veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	4.6	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.822	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	649	695	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.9 mi/h
		Percent free flow speed, PFFS	74.5 %
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	518	691	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	54.4		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	32.5		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )	68.3		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.38		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1381
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1693
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	517.2
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.55
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

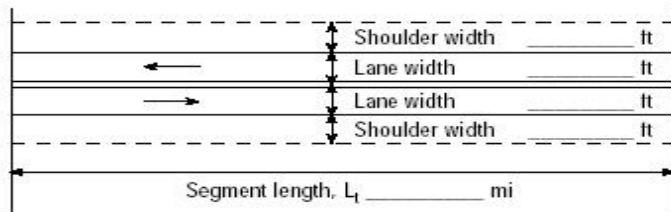
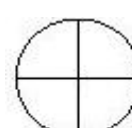
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway</p> <p>highway <input checked="" type="checkbox"/> Class III highway</p> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.40 mi    Up/down -5.0</p> <p>Peak-hour factor, PHF 0.87</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 2/mi</p> </div> <div style="width: 45%; text-align: center;">  <p>Show North Arrow</p> </div> </div>	
Analysis direction vol., V <sub>d</sub>	601veh/h		
Opposing direction vol., V <sub>o</sub>	450veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.1	4.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.994	0.822	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	0.97	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	695	649	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.7 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.8 mi/h
		Percent free flow speed, PFFS	74.2 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	691	518	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		61.5	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		32.5	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		80.1	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.41		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1680
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.2
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	690.8
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.70
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

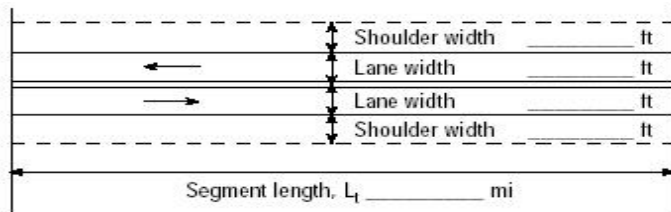
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway</p> <p>highway <input checked="" type="checkbox"/> Class III highway</p> <p>Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling</p> <p>Grade Length    mi    Up/down</p> <p>Peak-hour factor, PHF    0.80</p> <p>No-passing zone    100%</p> <p>% Trucks and Buses, P<sub>T</sub>    6%</p> <p>% Recreational vehicles, P<sub>R</sub>    0%</p> <p>Access points mi    10/mi</p> </div> <div style="width: 45%; text-align: center;">  <p>Show North Arrow</p> </div> </div>	
Analysis direction vol., V <sub>d</sub>	380veh/h		
Opposing direction vol., V <sub>o</sub>	559veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.8	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.965	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.94	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	530	739	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.5 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.4 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    44.9 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub> 33.7 mi/h		
	Percent free flow speed, PFFS    75.0 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.4	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.977	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.94	0.99	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	517	706	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	54.6		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	31.5		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	67.9		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.31		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.0
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	475.0
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.51
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

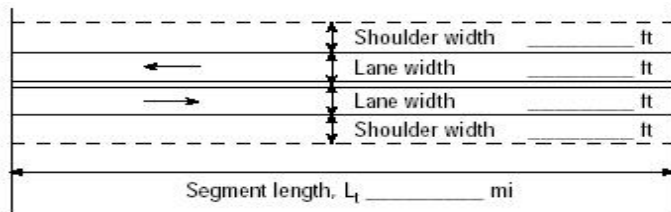


<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> </div> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.25 mi    Up/down 3.0</p> <p>Peak-hour factor, PHF 0.80</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 10/mi</p>	
Analysis direction vol., V <sub>d</sub>	559veh/h		
Opposing direction vol., V <sub>o</sub>	380veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.7	1.2	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.960	0.988	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	728	481	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.3 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	44.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	33.2 mi/h
		Percent free flow speed, PFFS	73.9 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.92	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	760	475	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )		64.6	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		31.3	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		83.9	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.43		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1581
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1581
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.9
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	698.8
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.71
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 EB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<input checked="" type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input checked="" type="checkbox"/> Rolling Grade Length    mi    Up/down Peak-hour factor, PHF    0.86 No-passing zone    100% % Trucks and Buses, P <sub>T</sub> 8 % % Recreational vehicles, P <sub>R</sub> 0% Access points <i>mi</i> 8/mi	
Analysis direction vol., V <sub>d</sub>	296veh/h		
Opposing direction vol., V <sub>o</sub>	535veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.1	1.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.919	0.947	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.86	0.97	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> / (PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	435	677	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.0 mi/h	
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.6 mi/h		Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    40.4 mi/h	
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 30.2 mi/h	
		Percent free flow speed, PFFS    74.8 %	
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.6	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.87	0.97	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	415	641	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )		46.9	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		32.9	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )		59.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)		E	
Volume to capacity ratio, v/c		0.26	

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1562
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	344.2
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.03
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 WB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<input checked="" type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input checked="" type="checkbox"/> Rolling Grade Length    mi    Up/down Peak-hour factor, PHF    0.86 No-passing zone    100% % Trucks and Buses, P <sub>T</sub> 8 % % Recreational vehicles, P <sub>R</sub> 0% Access points mi    8/mi	
Analysis direction vol., V <sub>d</sub>	535veh/h		
Opposing direction vol., V <sub>o</sub>	296veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.7	2.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.947	0.919	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	0.86	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	677	435	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.0 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    2.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    40.4 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 29.2 mi/h		
	Percent free flow speed, PFFS    72.3 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.97	0.87	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	641	415	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	58.2		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	32.9		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	78.2		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.40		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1433
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1499
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	622.1
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.33
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines and SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley SR 49

### Input Data

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.89

No-passing zone    100%

% Trucks and Buses,  $P_T$     6%

% Recreational vehicles,  $P_R$     0%

Access points *mi*    6/mi

Analysis direction vol., $V_d$	583veh/h
Opposing direction vol., $V_o$	592veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	1.0

### Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.6	1.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.965	0.965
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.98	0.98
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i=V_i/(PHF * f_{g,ATS} * f_{HV,ATS})$	693	703
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width, <sup>4</sup> $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.5 mi/h	Free-flow speed, FFS ( $FFS=BFFS-f_{LS}-f_A$ )    43.5 mi/h	
	Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 31.2 mi/h	
	Percent free flow speed, PFFS    71.7 %	

### Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.98	0.98
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i=V_i/(PHF * f_{HV,PTSF} * f_{g,PTSF})$	668	679
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%)=100(1-e^{-av_d^b})$	62.8	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	30.1	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	77.7	

### Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.41



Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	71.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	655.1
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.77
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines and SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley SR 49

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.89

No-passing zone    100%

% Trucks and Buses,  $P_T$     6%

% Recreational vehicles,  $P_R$     0%

Access points *mi*    6/mi

Analysis direction vol., $V_d$	592veh/h	Opposing direction vol., $V_o$	583veh/h
Shoulder width ft	6.0	Lane Width ft	12.0
Segment Length mi	1.0		

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.6	1.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.965	0.965
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.98	0.98
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	703	693
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.5 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    43.5 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 31.1 mi/h	
	Percent free flow speed, PFFS    71.6 %	

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.98	0.98
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	679	668
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	62.8	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	30.1	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	78.0	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.41

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	71.6
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	665.2
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.78
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley SR 49

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.88  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     9%  
 % Recreational vehicles,  $P_R$     0%  
 Access points  $mi$     4/mi

Show North Arrow

Analysis direction vol., $V_d$	508veh/h
Opposing direction vol., $V_o$	736veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	0.7

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.7	1.4
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.941	0.965
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.97	0.99
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	632	875

Free-Flow Speed from Field Measurement	Estimated Free-Flow Speed	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)	0.0 mi/h
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)	1.0 mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.2 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )	49.0 mi/h
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$	36.1 mi/h
	Percent free flow speed, PFFS	73.7 %

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.2	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.982	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.97	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	606	836
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	61.3	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	26.7	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	72.5	

**Level of Service and Other Performance Measures**

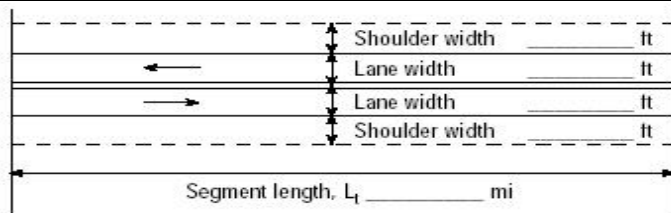

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.37

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1624
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	577.3
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.77
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description:

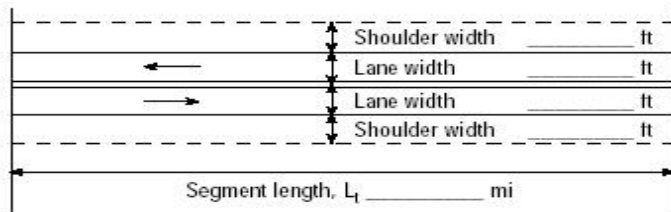

Input Data	
 <p>Shoulder width _____ ft</p> <p>Lane width _____ ft</p> <p>Lane width _____ ft</p> <p>Shoulder width _____ ft</p> <p>Segment length, <math>L_1</math> _____ mi</p>	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <input type="checkbox"/> Class I highway  <input checked="" type="checkbox"/> Class III highway  <input type="checkbox"/> Class II highway             </div> <div style="text-align: center;"> <input type="checkbox"/> Level  <input checked="" type="checkbox"/> Rolling             </div> </div> <p>Terrain</p> <p>Grade Length _____ mi Up/down</p> <p>Peak-hour factor, PHF 0.88</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, <math>P_T</math> 9%</p> <p>% Recreational vehicles, <math>P_R</math> 0%</p> <p>Access points <math>mi</math> 4/mi</p> <div style="text-align: center;">               Show North Arrow         </div>
<p>Analysis direction vol., <math>V_d</math> 736veh/h</p> <p>Oposing direction vol., <math>V_o</math> 508veh/h</p> <p>Shoulder width ft 6.0</p> <p>Lane Width ft 12.0</p> <p>Segment Length mi 0.7</p>	

Average Travel Speed		
	Analysis Direction (d)	Oposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.4	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.965	0.941
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.99	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	875	632
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed
<p>Mean speed of sample<sup>3</sup>, <math>S_{FM}</math></p> <p>Total demand flow rate, both directions, <math>v</math></p> <p>Free-flow speed, <math>FFS = S_{FM} + 0.00776(v / f_{HV,ATS})</math></p> <p>Adj. for no-passing zones, <math>f_{np,ATS}</math> (Exhibit 15-15) 1.8 mi/h</p>	<p>Base free-flow speed<sup>4</sup>, BFFS 50.0 mi/h</p> <p>Adj. for lane and shoulder width<sup>4</sup>, <math>f_{LS}</math> (Exhibit 15-7) 0.0 mi/h</p> <p>Adj. for access points<sup>4</sup>, <math>f_A</math> (Exhibit 15-8) 1.0 mi/h</p> <p>Free-flow speed, FFS (<math>FFS = BFFS - f_{LS} - f_A</math>) 49.0 mi/h</p> <p>Average travel speed, <math>ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}</math> 35.5 mi/h</p> <p>Percent free flow speed, PFFS 72.5 %</p>	

Percent Time-Spent-Following		
	Analysis Direction (d)	Oposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.2
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.982
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	0.97
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	836	606
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	68.1	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	26.7	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	83.6	

Level of Service and Other Performance Measures	
Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.51

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1552
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1649
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	836.4
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.96
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd EB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley SR 49			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway</p> <p>highway <input checked="" type="checkbox"/> Class III highway</p> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.25 mi    Up/down 3.0</p> <p>Peak-hour factor, PHF 0.79</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 2%</p> <p>Access points mi 3/mi</p> </div> <div style="width: 45%; text-align: center;">  <p>Show North Arrow</p> </div> </div>	
Analysis direction vol., V <sub>d</sub>	90veh/h		
Opposing direction vol., V <sub>o</sub>	112veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.6	1.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.912	0.960	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.79	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	158	148	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS 45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7) 2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8) 0.8 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15) 3.2 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 41.7 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub> 36.1 mi/h		
	Percent free flow speed, PFFS 86.7 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	114	143	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	13.1		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	55.2		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	37.6		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.09		



Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1260
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1693
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	86.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	113.9
Effective width, $Wv$ (Eq. 15-29) ft	21.70
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.41
Bicycle level of service (Exhibit 15-4)	C
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd WB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley SR 49

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.79  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     6%  
 % Recreational vehicles,  $P_R$     2%  
 Access points *mi*    3/mi

Show North Arrow

Analysis direction vol.,  $V_d$     112veh/h

Opposing direction vol.,  $V_o$     90veh/h

Shoulder width ft    2.0

Lane Width ft    12.0

Segment Length mi    0.1

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	2.5	2.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.916	0.911
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.70	0.68
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	221	184
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    0.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    3.7 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    41.7 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 34.8 mi/h	
	Percent free flow speed, PFFS    83.5 %	

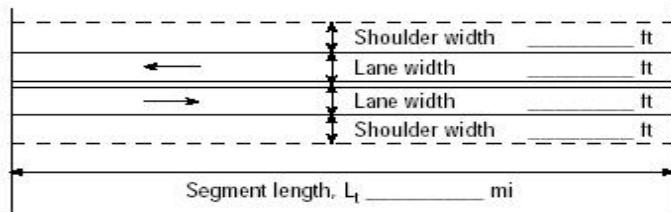
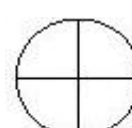
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.8	1.8
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.954	0.954
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.76	0.74
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	195	161
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	21.1	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	59.0	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	53.4	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	B
Volume to capacity ratio, $v/c$	0.13

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1121
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1249
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	83.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	141.8
Effective width, $Wv$ (Eq. 15-29) ft	20.16
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.85
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley SR 49			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> </div> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.40 mi    Up/down 5.0</p> <p>Peak-hour factor, PHF 0.87</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 2/mi</p>	
Analysis direction vol., V <sub>d</sub>	450veh/h		
Opposing direction vol., V <sub>o</sub>	601veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	4.6	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.822	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	649	695	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.9 mi/h
		Percent free flow speed, PFFS	74.5 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	518	691	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		54.4	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		32.5	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		68.3	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.38		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1381
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1693
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	517.2
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.55
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley SR 49

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length 0.40 mi    Up/down -5.0

Peak-hour factor, PHF 0.87

No-passing zone 100%

% Trucks and Buses,  $P_T$  6%

% Recreational vehicles,  $P_R$  0%

Access points *mi* 2/mi

Analysis direction vol., $V_d$	601veh/h
Opposing direction vol., $V_o$	450veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	0.4

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.1	4.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.994	0.822
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	1.00	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	695	649
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS 50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8) 0.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.7 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ ) 46.9 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 34.8 mi/h	
	Percent free flow speed, PFFS 74.2 %	

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	691	518
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	61.5	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	32.5	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	80.1	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.41

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1680
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.2
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	690.8
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.70
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley SR 49

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.80  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     6%  
 % Recreational vehicles,  $P_R$     0%  
 Access points *mi*    10/mi

Show North Arrow

Analysis direction vol., $V_d$	380veh/h
Opposing direction vol., $V_o$	559veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	0.7

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.8	1.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.954	0.965
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.94	0.98
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	530	739
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    2.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.4 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    44.9 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 33.7 mi/h	
	Percent free flow speed, PFFS    75.0 %	

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.4	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.977	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.94	0.99
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	517	706
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	54.6	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	31.5	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	67.9	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.31



Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.0
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	475.0
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.51
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley SR 49

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length 0.25 mi    Up/down 3.0

Peak-hour factor, PHF 0.80

No-passing zone 100%

% Trucks and Buses,  $P_T$  6%

% Recreational vehicles,  $P_R$  0%

Access points *mi* 10/mi

Analysis direction vol., $V_d$	559veh/h		
Opposing direction vol., $V_o$	380veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.7	1.2
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.960	0.988
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	728	481
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS 50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8) 2.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.3 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ ) 44.9 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 33.2 mi/h	
	Percent free flow speed, PFFS 73.9 %	

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.92	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	760	475
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	64.6	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	31.3	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	83.9	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.43

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1581
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1581
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.9
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	698.8
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.71
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	SR 174 EB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019

Project Description: Rise Grass Valley SR 49

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down \_\_\_\_\_

Peak-hour factor, PHF    0.86  
 No-passing zone    100%

% Trucks and Buses,  $P_T$     8 %  
 % Recreational vehicles,  $P_R$     0%  
 Access points *mi*    8/mi

Analysis direction vol., $V_d$	296veh/h
Opposing direction vol., $V_o$	535veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	2.1

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	2.1	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.919	0.947
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.86	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	435	677
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    2.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.6 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    40.4 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 30.2 mi/h	
	Percent free flow speed, PFFS    74.8 %	

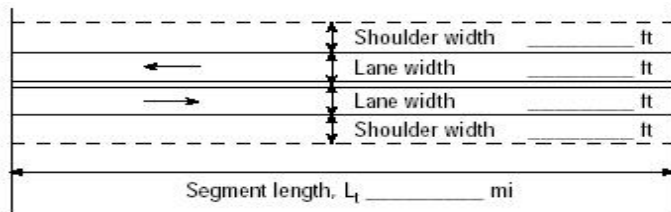
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.6	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.954	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.87	0.97
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	415	641
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	46.9	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	32.9	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	59.8	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	E
Volume to capacity ratio, $v/c$	0.26

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1562
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1666
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	344.2
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.03
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 WB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	EPAP plus Project Peak Hour	Analysis Year	2019
Project Description: Rise Grass Valley SR 49			
<b>Input Data</b>			
		<input checked="" type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input checked="" type="checkbox"/> Rolling Grade Length    mi    Up/down Peak-hour factor, PHF    0.86 No-passing zone    100% % Trucks and Buses, P <sub>T</sub> 8 % % Recreational vehicles, P <sub>R</sub> 0% Access points mi    8/mi	
Analysis direction vol., V <sub>d</sub>	535veh/h		
Opposing direction vol., V <sub>o</sub>	296veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.7	2.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.947	0.919	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	0.86	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	677	435	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.0 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    2.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    40.4 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub> 29.2 mi/h		
	Percent free flow speed, PFFS    72.3 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.97	0.87	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	641	415	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	58.2		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	32.9		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )	78.2		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.40		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1433
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1499
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	622.1
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.33
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	





## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative

Project Description: Rise Grass Valley 2 Lanes SB

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.89  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     6%  
 % Recreational vehicles,  $P_R$     0%  
 Access points *mi*    6/mi

Show North Arrow

Analysis direction vol., $V_d$	690veh/h	Opposing direction vol., $V_o$	671veh/h
Shoulder width ft	6.0	Lane Width ft	12.0
Lane Width ft	12.0	Segment Length mi	1.0

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.4	1.5
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.977	0.971
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.99	0.99
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	802	784

Free-Flow Speed from Field Measurement	Estimated Free-Flow Speed	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)	0.0 mi/h
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)	1.5 mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.2 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )	43.5 mi/h
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$	29.9 mi/h
	Percent free flow speed, PFFS	68.8 %

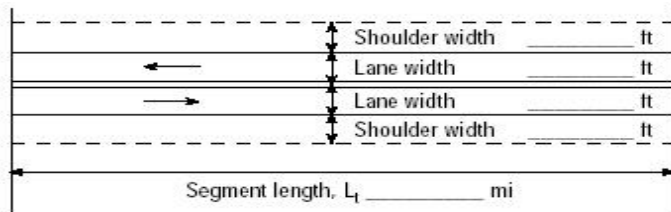

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	775	754
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	67.9	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	26.4	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	81.3	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.47

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1634
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	68.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	775.3
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.86
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative
Project Description: Rise Grass Valley - 2 lanes SB			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.89                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    6/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	671veh/h		
Opposing direction vol., V <sub>o</sub>	690veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.5	1.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.971	0.977	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.99	0.99	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	784	802	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.2 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	43.5 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	30.0 mi/h
		Percent free flow speed, PFFS	69.0 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	754	775	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )		67.8	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		26.4	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		80.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.46		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1644
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	69.0
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	753.9
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.84
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	Cumulative

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.88

No-passing zone    100%

% Trucks and Buses,  $P_T$     9%

% Recreational vehicles,  $P_R$     0%

Access points *mi*    4/mi

Analysis direction vol., $V_d$	804veh/h
Oposing direction vol., $V_o$	507veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	0.7

**Average Travel Speed**

	Analysis Direction (d)	Oposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.3	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.974	0.941
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	1.00	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	938	631
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.8 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    49.0 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 35.0 mi/h	
	Percent free flow speed, PFFS    71.5 %	

**Percent Time-Spent-Following**

	Analysis Direction (d)	Oposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.2
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.982
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	0.97
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	914	605
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	70.9	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	24.7	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	85.8	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.55

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1552
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1649
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	71.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	913.6
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.00
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	Cumulative

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length 0.25 mi    Up/down 3.0  
 Peak-hour factor, PHF 0.88  
 No-passing zone 100%  
 % Trucks and Buses,  $P_T$  9%  
 % Recreational vehicles,  $P_R$  0%  
 Access points *mi* 4/mi

Show North Arrow

Analysis direction vol.,  $V_d$  507veh/h

Oposing direction vol.,  $V_o$  804veh/h

Shoulder width ft 6.0

Lane Width ft 12.0

Segment Length mi 0.7

**Average Travel Speed**

	Analysis Direction (d)	Oposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.8	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.933	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	618	914
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS 50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8) 1.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.2 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ ) 49.0 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 35.9 mi/h	
	Percent free flow speed, PFFS 73.3 %	

**Percent Time-Spent-Following**

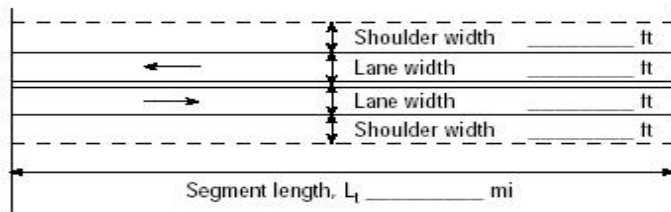
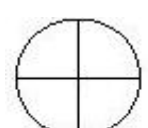
	Analysis Direction (d)	Oposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.92	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	626	914
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	62.9	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	24.4	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	72.8	

**Level of Service and Other Performance Measures**

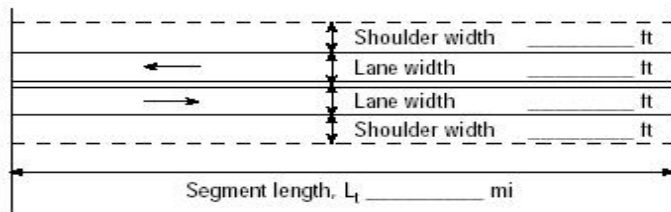
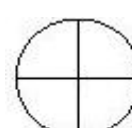
Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.36

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1685
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1564
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	576.1
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.77
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd EB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> </div> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.25 mi    Up/down 3.0</p> <p>Peak-hour factor, PHF 0.79</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 2%</p> <p>Access points mi 3/mi</p>	
Analysis direction vol., V <sub>d</sub>	66veh/h		
Opposing direction vol., V <sub>o</sub>	127veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.6	1.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.911	0.960	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.78	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	118	168	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.8 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	3.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	41.7 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	35.9 mi/h
		Percent free flow speed, PFFS	86.3 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	84	162	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		9.9	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		51.1	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		27.3	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.07		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1278
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1689
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	86.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	83.5
Effective width, $W_v$ (Eq. 15-29) ft	23.38
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.88
Bicycle level of service (Exhibit 15-4)	C
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd WB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.79                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    2%                  Access points mi    3/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	127veh/h		
Opposing direction vol., V <sub>o</sub>	66veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.5	2.7	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.916	0.906	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.72	0.67	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	244	138	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.8 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	3.0 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	41.7 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	35.7 mi/h
		Percent free flow speed, PFFS	85.7 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.8	1.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.949	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.77	0.73	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	219	121	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		23.3	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		51.6	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )		56.5	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.14		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1069
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1200
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	85.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	160.8
Effective width, $W_v$ (Eq. 15-29) ft	19.11
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.12
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length 0.40 mi    Up/down 5.0  
 Peak-hour factor, PHF 0.87  
 No-passing zone 100%  
 % Trucks and Buses,  $P_T$  6%  
 % Recreational vehicles,  $P_R$  0%  
 Access points mi 2/mi

Show North Arrow

Analysis direction vol., $V_d$	378veh/h
Opposing direction vol., $V_o$	561veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	0.4

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	4.9	1.1
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.812	0.994
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.87	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	615	649
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS 50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8) 0.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.7 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ ) 46.9 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 35.4 mi/h	
	Percent free flow speed, PFFS 75.5 %	

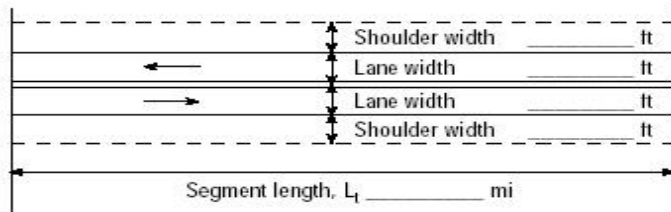
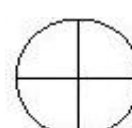
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	434	645
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	49.1	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	34.9	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	63.1	

**Level of Service and Other Performance Measures**

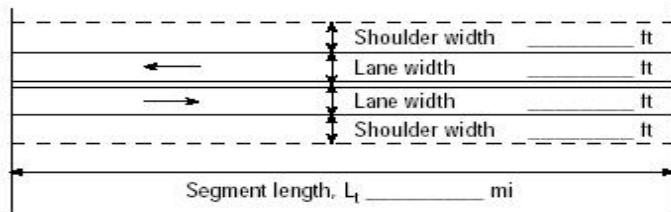
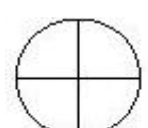
Level of service, LOS (Exhibit 15-3)	C
Volume to capacity ratio, $v/c$	0.36

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1379
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1693
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	434.5
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.46
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

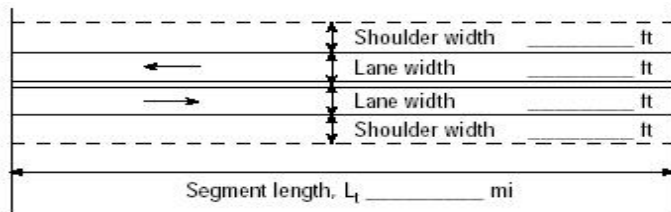

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> </div> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.40 mi    Up/down -5.0</p> <p>Peak-hour factor, PHF 0.87</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 2/mi</p>	
Analysis direction vol., V <sub>d</sub>	561veh/h		
Opposing direction vol., V <sub>o</sub>	378veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.1	4.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.994	0.812	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	0.87	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	649	615	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15) 1.8 mi/h		Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	35.3 mi/h
		Percent free flow speed, PFFS	75.3 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	645	434	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )		58.8	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		34.9	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )		79.7	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.38		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1670
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	644.8
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.66
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

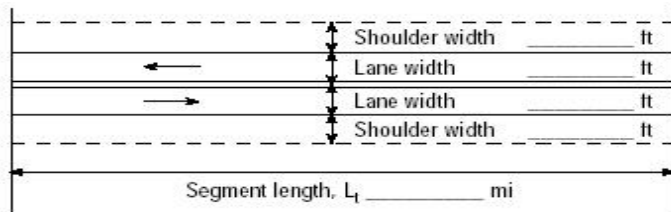


<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p><input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway</p> <p>highway <input checked="" type="checkbox"/> Class III highway</p> <p>Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling</p> <p>Grade Length    mi    Up/down</p> <p>Peak-hour factor, PHF    0.80</p> <p>No-passing zone    100%</p> <p>% Trucks and Buses, P<sub>T</sub>    6%</p> <p>% Recreational vehicles, P<sub>R</sub>    0%</p> <p>Access points mi    10/mi</p> </div> <div style="width: 50%; text-align: center;">  <p>Show North Arrow</p> </div> </div>	
Analysis direction vol., V <sub>d</sub>	378veh/h		
Opposing direction vol., V <sub>o</sub>	561veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.9	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.949	0.965	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.94	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	530	742	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.5 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.4 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    44.9 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 33.7 mi/h		
	Percent free flow speed, PFFS    75.0 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.4	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.977	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.94	0.99	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	515	708	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	54.5		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	31.5		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	67.8		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.31		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	75.0
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	472.5
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.51
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period		Analysis Year	Cumulative
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.80                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    10/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	561veh/h		
Opposing direction vol., V <sub>o</sub>	378veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.6	1.9	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.965	0.949	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	0.94	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	742	530	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.1 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	44.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	32.9 mi/h
		Percent free flow speed, PFFS	73.3 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.977	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.99	0.94	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	708	515	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		62.6	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		31.5	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )		80.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.44		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1541
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1613
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	701.3
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.71
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 EB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<input checked="" type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input checked="" type="checkbox"/> Rolling Grade Length    mi    Up/down Peak-hour factor, PHF    0.86 No-passing zone    100% % Trucks and Buses, P <sub>T</sub> 8 % % Recreational vehicles, P <sub>R</sub> 0% Access points mi    8/mi	
Analysis direction vol., V <sub>d</sub>	303veh/h		
Opposing direction vol., V <sub>o</sub>	606veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.0	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.926	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.87	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	437	754	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.0 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.3 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    40.4 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 29.8 mi/h		
	Percent free flow speed, PFFS    73.8 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.6	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.88	0.99	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	420	712	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	49.1		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	30.0		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	60.2		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.26		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1589
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	352.3
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.04
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	SR 174 WB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	Cumulative

Project Description: Rise Grass Valley

### Input Data

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway

Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.86

No-passing zone    100%

% Trucks and Buses,  $P_T$     8 %

% Recreational vehicles,  $P_R$     0%

Access points *mi*    8/mi

Show North Arrow

Analysis direction vol.,  $V_d$     606veh/h

Opposing direction vol.,  $V_o$     303veh/h

Shoulder width ft    2.0

Lane Width ft    12.0

Segment Length mi    2.1

### Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.6	2.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.954	0.926
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.98	0.87
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	754	437
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    2.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    2.5 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    40.4 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 28.6 mi/h	
	Percent free flow speed, PFFS    70.9 %	

### Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.954
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.99	0.88
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	712	420
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	61.5	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	30.0	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	80.4	

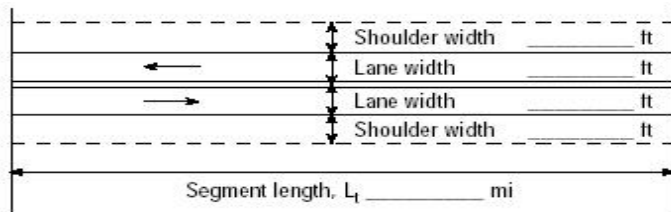
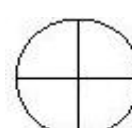
### Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	E
Volume to capacity ratio, $v/c$	0.44

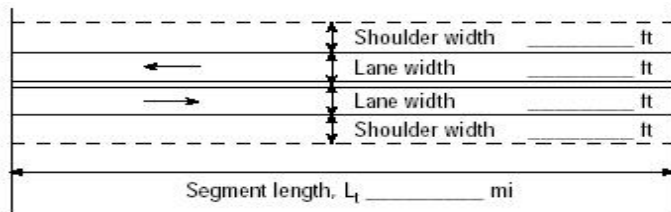

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1433
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1499
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	70.9
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	704.7
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.40
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	





<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley 2 Lanes SB			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.89                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    6/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	717veh/h		
Opposing direction vol., V <sub>o</sub>	veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.4	1.5	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.977	0.971	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.99	0.99	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	833	784	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.2 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	43.5 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	29.7 mi/h
		Percent free flow speed, PFFS	68.3 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	806	754	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	69.1		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	25.8		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> (v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )	82.4		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.49		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1634
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	68.3
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	805.6
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.88
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley - 2 lanes SB			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway             </div> <div style="text-align: center;"> <input type="checkbox"/> Level    <input type="checkbox"/> Rolling                  Terrain             </div> </div> <p>Grade Length 0.25 mi    Up/down 3.0</p> <p>Peak-hour factor, PHF 0.89</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 6/mi</p> <div style="text-align: center;">                   Show North Arrow             </div>	
Analysis direction vol., V <sub>d</sub>	688veh/h		
Opposing direction vol., V <sub>o</sub>	717veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.4	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.976	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	792	810	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.2 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	43.5 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	29.9 mi/h
		Percent free flow speed, PFFS	68.7 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.92	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	840	806	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )		70.7	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		24.4	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )		83.2	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.47		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1671
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1564
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	68.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	773.0
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.86
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.88

No-passing zone    100%

% Trucks and Buses,  $P_T$     9%

% Recreational vehicles,  $P_R$     0%

Access points *mi*    4/mi

Analysis direction vol., $V_d$	861veh/h
Opposing direction vol., $V_o$	veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	0.7

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.3	1.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.974	0.941
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	1.00	0.97
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	1005	631
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.8 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    49.0 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 34.5 mi/h	
	Percent free flow speed, PFFS    70.4 %	

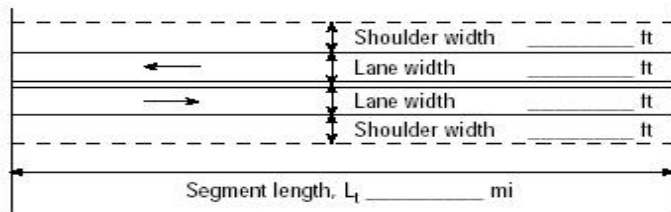
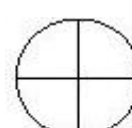
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.2
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.982
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	0.97
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	978	605
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	73.0	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	23.0	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	87.2	

**Level of Service and Other Performance Measures**

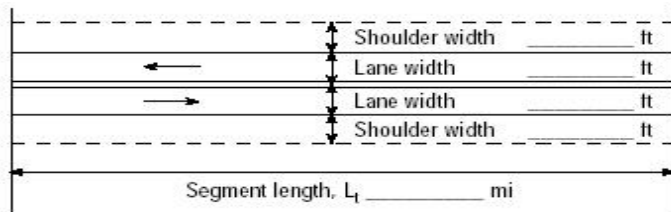
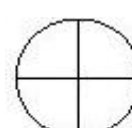
Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.59

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1552
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1649
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	70.4
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	978.4
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.04
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.88                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    9 %                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    4/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	590veh/h		
Opposing direction vol., V <sub>o</sub>	861veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.6	1.3	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.949	0.974	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	721	1005	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.0 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.1 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	49.0 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	34.5 mi/h
		Percent free flow speed, PFFS	70.4 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.98	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	684	978	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )		66.6	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		23.0	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )		76.1	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.42		



Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1656
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	70.4
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	670.5
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.84
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd EB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.79                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    2%                  Access points mi    3/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	84veh/h		
Opposing direction vol., V <sub>o</sub>	139veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.7	2.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.906	0.921	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.67	0.73	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	175	262	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.8 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	3.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	41.7 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.7 mi/h
		Percent free flow speed, PFFS	83.2 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.8	1.8	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.73	0.78	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	153	236	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		17.4	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		54.4	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		38.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.10		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1345
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1338
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	83.2
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	106.3
Effective width, $Wv$ (Eq. 15-29) ft	22.12
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.28
Bicycle level of service (Exhibit 15-4)	C
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd WB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.79

No-passing zone    100%

% Trucks and Buses,  $P_T$     6%

% Recreational vehicles,  $P_R$     2%

Access points *mi*    3/mi

Analysis direction vol., $V_d$	139veh/h
Opposing direction vol., $V_o$	84veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	0.1

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	2.4	2.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.921	0.906
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.73	0.67
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	262	175
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    0.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    3.6 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    41.7 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 34.7 mi/h	
	Percent free flow speed, PFFS    83.2 %	

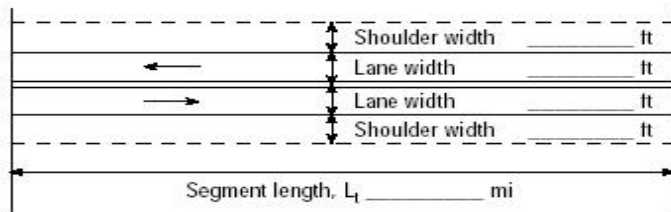
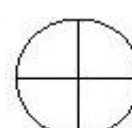
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.8	1.8
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.954	0.954
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.78	0.73
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	236	153
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	24.8	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	54.4	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	57.8	

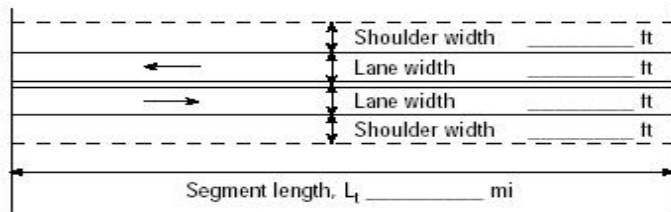
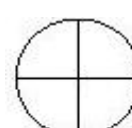
**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	C
Volume to capacity ratio, $v/c$	0.15

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1106
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1249
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	83.2
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	175.9
Effective width, $W_v$ (Eq. 15-29) ft	18.27
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.32
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

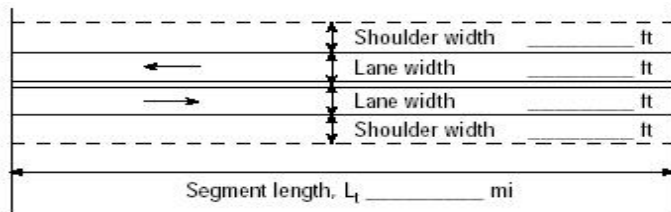
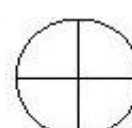
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling                  Grade Length 0.40 mi    Up/down 5.0                  Peak-hour factor, PHF 0.87                  No-passing zone 100%                  % Trucks and Buses, P<sub>T</sub> 6%                  % Recreational vehicles, P<sub>R</sub> 0%                  Access points mi 2/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	463veh/h		
Opposing direction vol., V <sub>o</sub>	veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	4.6	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.823	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.97	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	667	711	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.7 mi/h
		Percent free flow speed, PFFS	74.0 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	533	707	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		55.5	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		31.7	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )		69.1	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.39		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1384
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1692
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.0
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	532.2
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.57
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

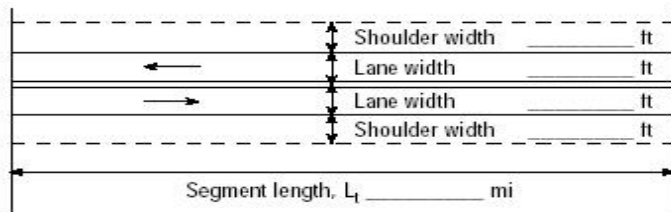
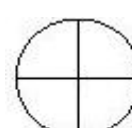
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling                  Grade Length 0.40 mi    Up/down -5.0                  Peak-hour factor, PHF 0.87                  No-passing zone 100%                  % Trucks and Buses, P<sub>T</sub> 6%                  % Recreational vehicles, P<sub>R</sub> 0%                  Access points mi 2/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	625veh/h		
Opposing direction vol., V <sub>o</sub>	463veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.1	4.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.994	0.823	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	0.97	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	723	667	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.5 mi/h
		Percent free flow speed, PFFS	73.5 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	718	533	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		63.1	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		31.4	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )		81.1	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.43		



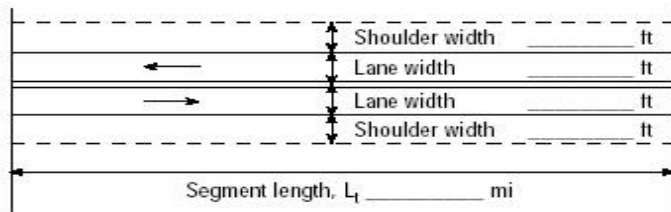
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1680
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	718.4
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.72
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.80                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    10/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	393veh/h		
Opposing direction vol., V <sub>o</sub>	583veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.8	1.5	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.971	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.95	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	542	766	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.3 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	44.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	33.4 mi/h
		Percent free flow speed, PFFS	74.5 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.4	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.977	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.95	0.99	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	530	736	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		56.0	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		30.5	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		68.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.32		

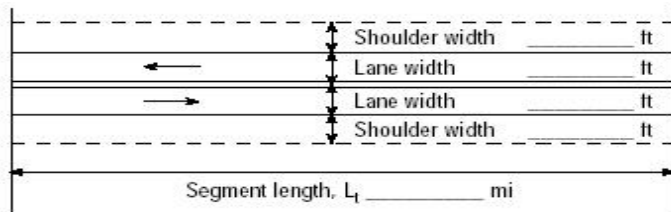
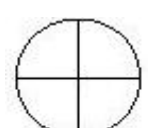
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1618
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	491.3
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.53
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.80                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    10/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	583veh/h		
Opposing direction vol., V <sub>o</sub>	393veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.5	1.8	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.971	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	0.95	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	766	542	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.1 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	44.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	32.7 mi/h
		Percent free flow speed, PFFS	72.8 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.977	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.99	0.95	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	736	530	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		64.1	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		30.5	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> (v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		81.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.45		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1557
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1613
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	728.8
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.73
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 EB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<input checked="" type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input checked="" type="checkbox"/> Rolling Grade Length    mi    Up/down Peak-hour factor, PHF    0.86 No-passing zone    100% % Trucks and Buses, P <sub>T</sub> 8 % % Recreational vehicles, P <sub>R</sub> 0% Access points mi    8/mi	
Analysis direction vol., V <sub>d</sub>	309veh/h		
Opposing direction vol., V <sub>o</sub>	610veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.0	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.926	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.87	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	446	759	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)    2.6 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)    2.0 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    1.3 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )    40.4 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> 29.7 mi/h		
	Percent free flow speed, PFFS    73.6 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.6	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.88	0.99	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	428	716	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )	49.6		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	29.9		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	60.8		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.26		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1589
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.6
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	359.3
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.05
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>																											
General Information		Site Information																									
Analyst	JF	Highway / Direction of Travel	SR 174 WB																								
Agency or Company	Nevada County	From/To	Empire to SR 174																								
Date Performed	12/23/2019	Jurisdiction	NV County																								
Analysis Time Period	Peak Hour	Analysis Year	CPP Centennial																								
Project Description: Rise Grass Valley																											
Input Data																											
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <input checked="" type="checkbox"/> Class I highway  <input type="checkbox"/> Class II highway  <input type="checkbox"/> Class III highway             </div> <div style="text-align: center;"> <input type="checkbox"/> Level  <input checked="" type="checkbox"/> Rolling             </div> </div> <div style="margin-top: 10px;">  <p>Show North Arrow</p> </div> <div style="margin-top: 10px;"> <table style="width: 100%; border: none;"> <tr> <td style="padding: 2px;">Grade Length</td> <td style="padding: 2px;">mi</td> <td style="padding: 2px;">Up/down</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Peak-hour factor, PHF</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="padding: 2px;">0.86</td> </tr> <tr> <td style="padding: 2px;">No-passing zone</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="padding: 2px;">100%</td> </tr> <tr> <td style="padding: 2px;">% Trucks and Buses, P<sub>T</sub></td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="padding: 2px;">8 %</td> </tr> <tr> <td style="padding: 2px;">% Recreational vehicles, P<sub>R</sub></td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="padding: 2px;">0%</td> </tr> <tr> <td style="padding: 2px;">Access points</td> <td style="padding: 2px;">mi</td> <td style="padding: 2px;"></td> <td style="padding: 2px;">8/mi</td> </tr> </table> </div>		Grade Length	mi	Up/down		Peak-hour factor, PHF			0.86	No-passing zone			100%	% Trucks and Buses, P <sub>T</sub>			8 %	% Recreational vehicles, P <sub>R</sub>			0%	Access points	mi		8/mi
Grade Length	mi	Up/down																									
Peak-hour factor, PHF			0.86																								
No-passing zone			100%																								
% Trucks and Buses, P <sub>T</sub>			8 %																								
% Recreational vehicles, P <sub>R</sub>			0%																								
Access points	mi		8/mi																								
Analysis direction vol., V <sub>d</sub>	610veh/h																										
Opposing direction vol., V <sub>o</sub>	309veh/h																										
Shoulder width ft	2.0																										
Lane Width ft	12.0																										
Segment Length mi	2.1																										
Average Travel Speed																											
		Analysis Direction (d)	Opposing Direction (o)																								
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)		1.6	2.0																								
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)		1.1	1.1																								
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))		0.954	0.926																								
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)		0.98	0.87																								
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )		759	446																								
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed																									
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h																								
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h																								
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.0 mi/h																								
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	40.4 mi/h																								
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	28.6 mi/h																								
		Percent free flow speed, PFFS	70.7 %																								
Percent Time-Spent-Following																											
		Analysis Direction (d)	Opposing Direction (o)																								
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)		1.0	1.6																								
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)		1.0	1.0																								
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))		1.000	0.954																								
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)		0.99	0.88																								
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )		716	428																								
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		62.8																									
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		29.9																									
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		81.5																									
Level of Service and Other Performance Measures																											
Level of service, LOS (Exhibit 15-3)		E																									
Volume to capacity ratio, v/c		0.45																									



Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1443
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1516
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	70.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	709.3
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.40
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	CPP SR 49

Project Description: Rise Grass Valley 2 Lanes SB

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling  
 Grade Length \_\_\_\_\_ mi    Up/down  
 Peak-hour factor, PHF    0.89  
 No-passing zone    100%  
 % Trucks and Buses,  $P_T$     6%  
 % Recreational vehicles,  $P_R$     0%  
 Access points  $mi$     6/mi

Show North Arrow

Analysis direction vol., $V_d$	724veh/h
Opposing direction vol., $V_o$	696veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	1.0

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.4	1.4
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.977	0.977
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.99	0.99
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i=V_i/(PHF * f_{g,ATS} * f_{HV,ATS})$	841	809
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width, <sup>4</sup> $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.2 mi/h	Free-flow speed, FFS ( $FFS=BFFS-f_{LS}-f_A$ )    43.5 mi/h	
	Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 29.5 mi/h	
	Percent free flow speed, PFFS    67.8 %	

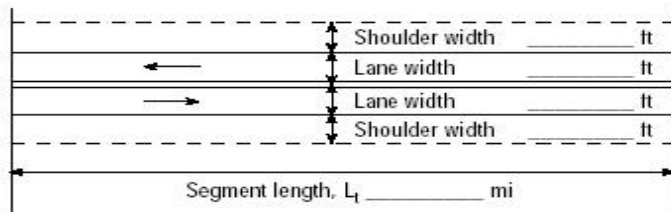
**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i=V_i/(PHF * f_{HV,PTSF} * f_{g,PTSF})$	813	782
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%)=100(1-e^{-av_d^b})$	69.6	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	25.3	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	82.5	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.49

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1644
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	67.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	813.5
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.88
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to SR 49/20
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	PM Peak Hour	Analysis Year	CPP SR 49
Project Description: Rise Grass Valley - 2 lanes SB			
<b>Input Data</b>			
		<input type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input checked="" type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length 0.25 mi    Up/down 3.0 Peak-hour factor, PHF 0.89 No-passing zone 100% % Trucks and Buses, P <sub>T</sub> 6% % Recreational vehicles, P <sub>R</sub> 0% Access points mi 6/mi	
Analysis direction vol., V <sub>d</sub>	696veh/h		
Opposing direction vol., V <sub>o</sub>	724veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.4	1.1	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.978	0.994	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	800	818	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>	Base free-flow speed <sup>4</sup> , BFFS 45.0 mi/h		
Total demand flow rate, both directions, v	Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7) 0.0 mi/h		
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8) 1.5 mi/h		
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15) 1.2 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> ) 43.5 mi/h		
	Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub> 29.8 mi/h		
	Percent free flow speed, PFFS 68.4 %		
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.92	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	850	813	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	71.1		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	24.2		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )	83.5		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.47		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1673
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1564
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	68.4
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	782.0
Effective width, $W_v$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.86
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP SR 49

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.88

No-passing zone    100%

% Trucks and Buses,  $P_T$     9%

% Recreational vehicles,  $P_R$     0%

Access points *mi*    4/mi

Analysis direction vol., $V_d$	861veh/h
Opposing direction vol., $V_o$	590veh/h
Shoulder width ft	6.0
Lane Width ft	12.0
Segment Length mi	0.7

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	1.3	1.6
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.974	0.949
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	1.00	0.98
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	1005	721
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    1.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    1.5 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    49.0 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 34.1 mi/h	
	Percent free flow speed, PFFS    69.6 %	

**Percent Time-Spent-Following**

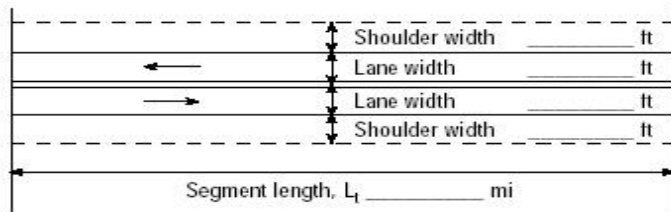

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	0.98
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	978	684
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	74.3	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	23.0	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	87.8	

**Level of Service and Other Performance Measures**

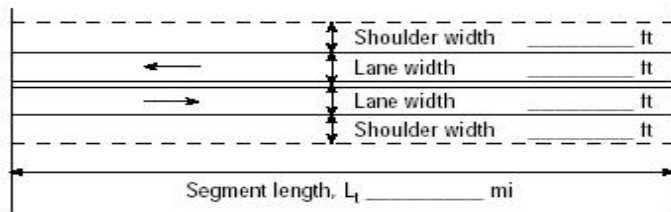
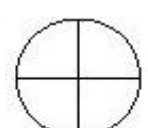
Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.59

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1581
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	69.6
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	978.4
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.04
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Whispering Pines to Bennett
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.88                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    9 %                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    4/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	590veh/h		
Opposing direction vol., V <sub>o</sub>	861veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.6	1.3	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.949	0.974	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	1.00	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	721	1005	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)	0.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	1.0 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.1 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	49.0 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	34.5 mi/h
		Percent free flow speed, PFFS	70.4 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.98	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	684	978	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		66.6	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		23.0	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )		76.1	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.42		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1656
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	70.4
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	670.5
Effective width, $Wv$ (Eq. 15-29) ft	24.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.84
Bicycle level of service (Exhibit 15-4)	E
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd EB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period		Analysis Year	CPP SR 49
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.79                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    2%                  Access points mi    3/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	84veh/h		
Opposing direction vol., V <sub>o</sub>	139veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.7	2.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.906	0.921	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.67	0.73	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	175	262	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.8 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	3.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	41.7 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.7 mi/h
		Percent free flow speed, PFFS	83.2 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.8	1.8	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.73	0.78	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	153	236	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		17.4	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		54.4	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		38.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.10		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1235
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1338
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	83.2
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	106.3
Effective width, $Wv$ (Eq. 15-29) ft	22.12
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.28
Bicycle level of service (Exhibit 15-4)	C
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	E. Bennett Rd WB
Agency or Company	Nevada County	From/To	west of Brunswick
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length \_\_\_\_\_ mi    Up/down

Peak-hour factor, PHF    0.79

No-passing zone    100%

% Trucks and Buses,  $P_T$     6%

% Recreational vehicles,  $P_R$     2%

Access points *mi*    3/mi

Analysis direction vol., $V_d$	139veh/h
Opposing direction vol., $V_o$	84veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	0.1

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	2.4	2.7
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.1	1.1
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.921	0.906
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.73	0.67
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	262	175
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS    45.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7)    2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8)    0.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)    3.6 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ )    41.7 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 34.7 mi/h	
	Percent free flow speed, PFFS    83.2 %	

**Percent Time-Spent-Following**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.8	1.8
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.954	0.954
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	0.78	0.73
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	236	153
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	24.8	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	54.4	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	57.8	

**Level of Service and Other Performance Measures**

Level of service, LOS (Exhibit 15-3)	C
Volume to capacity ratio, $v/c$	0.15

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1106
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1249
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	83.2
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	175.9
Effective width, $W_v$ (Eq. 15-29) ft	18.27
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.32
Bicycle level of service (Exhibit 15-4)	D
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

## DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP SR 49

Project Description: Rise Grass Valley

**Input Data**

Segment length,  $L_1$  \_\_\_\_\_ mi

Class I highway     Class II highway  
 Class III highway

Terrain     Level     Rolling

Grade Length 0.40 mi    Up/down 5.0

Peak-hour factor, PHF 0.87

No-passing zone 100%

% Trucks and Buses,  $P_T$  6%

% Recreational vehicles,  $P_R$  0%

Access points *mi* 2/mi

Analysis direction vol., $V_d$	463veh/h
Opposing direction vol., $V_o$	625veh/h
Shoulder width ft	2.0
Lane Width ft	12.0
Segment Length mi	0.4

**Average Travel Speed**

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)	4.6	1.1
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.823	0.994
Grade adjustment factor <sup>1</sup> , $f_{g,ATS}$ (Exhibit 15-9)	0.97	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	667	723
<b>Free-Flow Speed from Field Measurement</b>	<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , $S_{FM}$	Base free-flow speed <sup>4</sup> , BFFS 50.0 mi/h	
Total demand flow rate, both directions, $v$	Adj. for lane and shoulder width <sup>4</sup> , $f_{LS}$ (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$	Adj. for access points <sup>4</sup> , $f_A$ (Exhibit 15-8) 0.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.5 mi/h	Free-flow speed, FFS ( $FFS = BFFS - f_{LS} - f_A$ ) 46.9 mi/h	
	Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + V_{o,ATS}) - f_{np,ATS}$ 34.6 mi/h	
	Percent free flow speed, PFFS 73.9 %	

**Percent Time-Spent-Following**

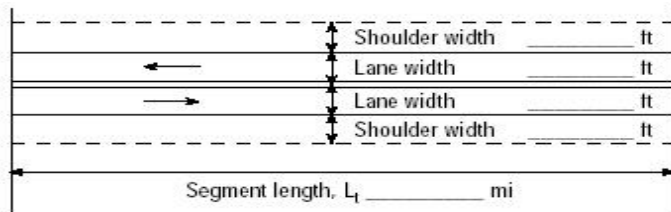
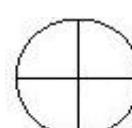
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	533	718
Base percent time-spent-following <sup>4</sup> , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	56.0	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	31.4	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + V_{o,PTSF})$	69.4	

**Level of Service and Other Performance Measures**

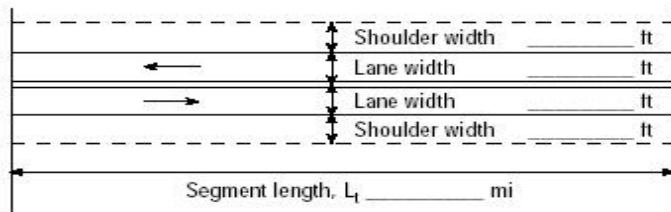

Level of service, LOS (Exhibit 15-3)	D
Volume to capacity ratio, $v/c$	0.39

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1404
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1691
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.9
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	532.2
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.57
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

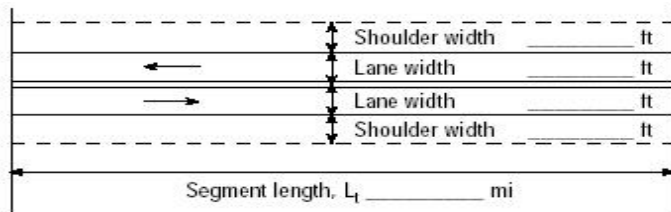
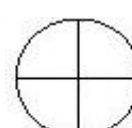


<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Bennett to Project Access
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	CPP SR 49
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                 </div> </div> <p>Terrain    <input type="checkbox"/> Level    <input type="checkbox"/> Rolling</p> <p>Grade Length 0.40 mi    Up/down -5.0</p> <p>Peak-hour factor, PHF 0.87</p> <p>No-passing zone 100%</p> <p>% Trucks and Buses, P<sub>T</sub> 6%</p> <p>% Recreational vehicles, P<sub>R</sub> 0%</p> <p>Access points mi 2/mi</p>	
Analysis direction vol., V <sub>d</sub>	625veh/h		
Opposing direction vol., V <sub>o</sub>	463veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.4		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.1	4.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.994	0.823	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	0.97	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	723	667	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	0.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.6 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	46.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +V <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	34.5 mi/h
		Percent free flow speed, PFFS	73.5 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	718	533	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		63.1	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		31.4	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +V <sub>o,PTSF</sub> )		81.1	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.43		

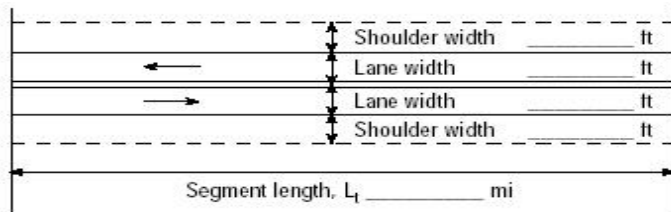
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1680
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	718.4
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.72
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd NB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.80                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    10/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	393veh/h		
Opposing direction vol., V <sub>o</sub>	583veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.8	1.5	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.971	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.95	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	542	766	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.3 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	44.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	33.4 mi/h
		Percent free flow speed, PFFS	74.5 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.4	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.977	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.95	0.99	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	530	736	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		56.0	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		30.5	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		68.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.32		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1618
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.5
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	491.3
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.53
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

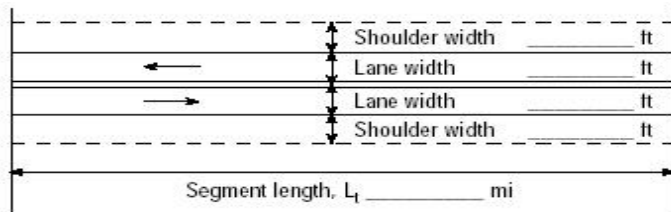
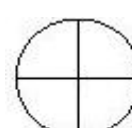
<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	Brunswick Rd SB
Agency or Company	Nevada County	From/To	Project Access to SR 174
Date Performed	10/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input checked="" type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.80                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    6%                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    10/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	583veh/h		
Opposing direction vol., V <sub>o</sub>	393veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	0.7		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.5	1.8	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.971	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	0.95	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	766	542	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	50.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.5 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)    2.1 mi/h		Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	44.9 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	32.7 mi/h
		Percent free flow speed, PFFS	72.8 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.4	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.977	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.99	0.95	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	736	530	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub><sup>b</sup></sup> )	64.1		
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	30.5		
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )	81.8		
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.45		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1557
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1613
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.8
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	728.8
Effective width, $Wv$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.73
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 EB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<input checked="" type="checkbox"/> Class I highway <input type="checkbox"/> Class II highway <input type="checkbox"/> Class III highway Terrain <input type="checkbox"/> Level <input checked="" type="checkbox"/> Rolling Grade Length    mi    Up/down Peak-hour factor, PHF    0.86 No-passing zone    100% % Trucks and Buses, P <sub>T</sub> 8 % % Recreational vehicles, P <sub>R</sub> 0% Access points mi    8/mi	
Analysis direction vol., V <sub>d</sub>	309veh/h		
Opposing direction vol., V <sub>o</sub>	610veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	2.0	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.926	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.87	0.98	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	446	759	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.0 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	1.3 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	40.4 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> + V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	29.7 mi/h
		Percent free flow speed, PFFS	73.6 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.6	1.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	1.000	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.88	0.99	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	428	716	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		49.6	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		29.9	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + V <sub>o,PTSF</sub> )		60.8	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.26		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1589
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1683
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	73.6
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	359.3
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.05
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	



<b>DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET</b>			
<b>General Information</b>		<b>Site Information</b>	
Analyst	JF	Highway / Direction of Travel	SR 174 WB
Agency or Company	Nevada County	From/To	Empire to SR 174
Date Performed	12/23/2019	Jurisdiction	NV County
Analysis Time Period	Peak Hour	Analysis Year	
Project Description: Rise Grass Valley			
<b>Input Data</b>			
		<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Show North Arrow</p> </div> <div> <input checked="" type="checkbox"/> Class I highway    <input type="checkbox"/> Class II highway  <input type="checkbox"/> Class III highway                  Terrain    <input type="checkbox"/> Level    <input checked="" type="checkbox"/> Rolling                  Grade Length    mi    Up/down                  Peak-hour factor, PHF    0.86                  No-passing zone    100%                  % Trucks and Buses, P<sub>T</sub>    8 %                  % Recreational vehicles, P<sub>R</sub>    0%                  Access points mi    8/mi             </div> </div>	
Analysis direction vol., V <sub>d</sub>	610veh/h		
Opposing direction vol., V <sub>o</sub>	309veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	2.1		
<b>Average Travel Speed</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.6	2.0	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.1	1.1	
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.954	0.926	
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	0.98	0.87	
Demand flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>g,ATS</sub> *f <sub>HV,ATS</sub> )	759	446	
<b>Free-Flow Speed from Field Measurement</b>		<b>Estimated Free-Flow Speed</b>	
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Base free-flow speed <sup>4</sup> , BFFS	45.0 mi/h
Total demand flow rate, both directions, v		Adj. for lane and shoulder width <sup>4</sup> , f <sub>LS</sub> (Exhibit 15-7)	2.6 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/f <sub>HV,ATS</sub> )		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibit 15-8)	2.0 mi/h
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhibit 15-15)	2.5 mi/h	Free-flow speed, FFS (FFS=BFFS-f <sub>LS</sub> -f <sub>A</sub> )	40.4 mi/h
		Average travel speed, ATS <sub>d</sub> =FFS-0.00776(v <sub>d,ATS</sub> +v <sub>o,ATS</sub> )-f <sub>np,ATS</sub>	28.6 mi/h
		Percent free flow speed, PFFS	70.7 %
<b>Percent Time-Spent-Following</b>			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.6	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	1.000	0.954	
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	0.99	0.88	
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *f <sub>g,PTSF</sub> )	716	428	
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>-av<sub>d</sub></sup> )		62.8	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		29.9	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +v <sub>o,PTSF</sub> )		81.5	
<b>Level of Service and Other Performance Measures</b>			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.45		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1443
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1516
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	70.7
<b>Bicycle Level of Service</b>	
Directional demand flow rate in outside lane, $v_{OL}$ (Eq. 15-24) veh/h	709.3
Effective width, $W_v$ (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.40
Bicycle level of service (Exhibit 15-4)	F
<b>Notes</b>	
<p>1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.</p> <p>2. If <math>v_i(v_d \text{ or } v_o) \geq 1,700</math> pc/h, terminate analysis--the LOS is F.</p> <p>3. For the analysis direction only and for <math>v &gt; 200</math> veh/h.</p> <p>4. For the analysis direction only</p> <p>5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.</p> <p>6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.</p>	

# TECHNICAL LOS APPENDIX VI

FOR

## IDAHO-MARYLAND MINE PROJECT TRAFFIC IMPACT ANALYSIS

Nevada County, CA

### PEAK HOUR SIGNAL WARRANTS

*Prepared For:*

**Rise Grass Valley Inc.**

*Prepared By:*

**KD Anderson & Associates, Inc.**  
3853 Taylor Road, Suite G  
Loomis, CA 95650  
(916) 660-1555

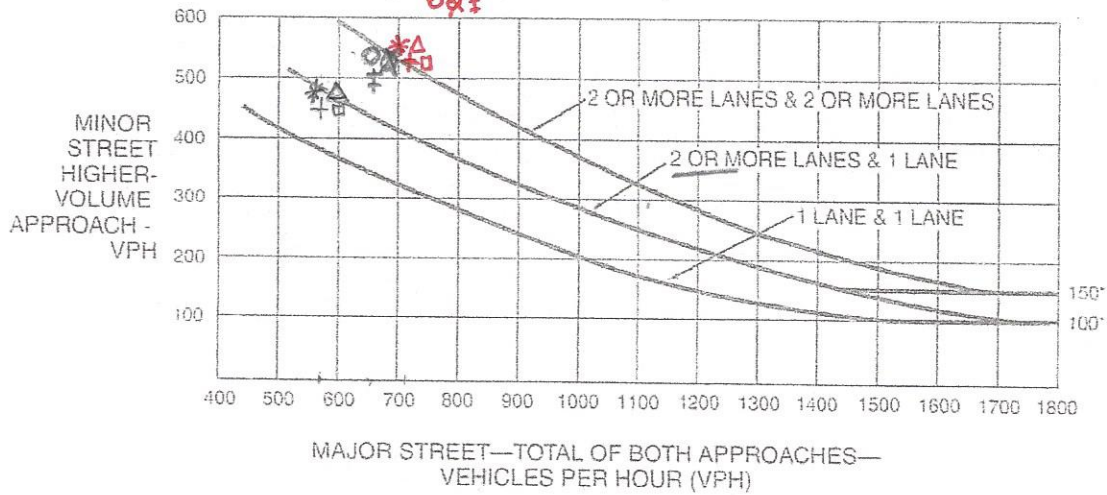


April 8, 2021

*KD Anderson & Associates, Inc.*

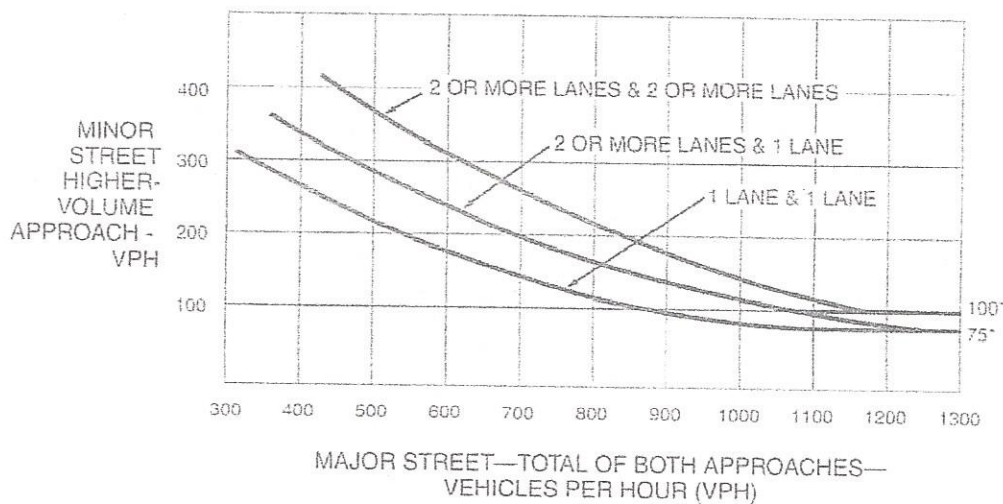
Transportation Engineers

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

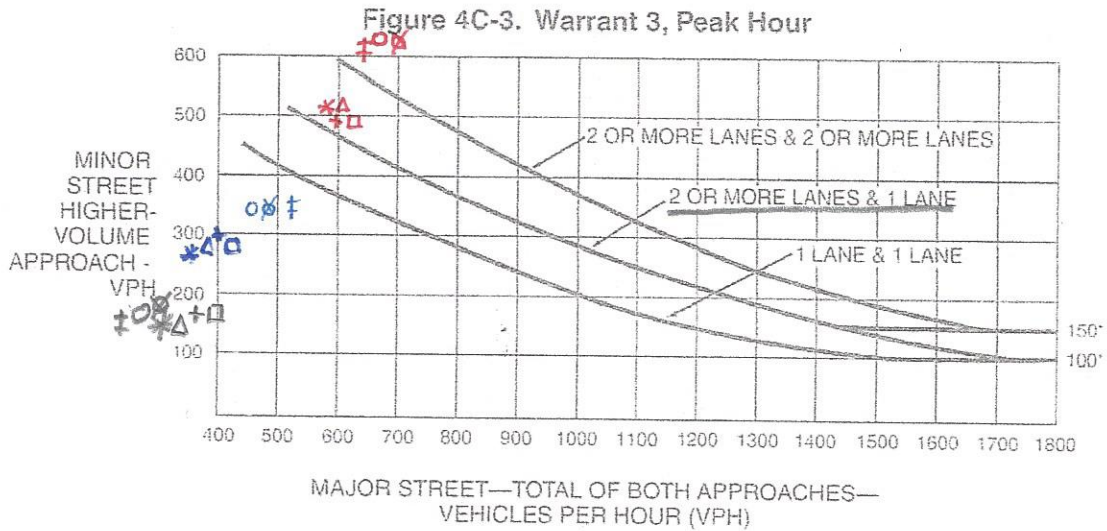


\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

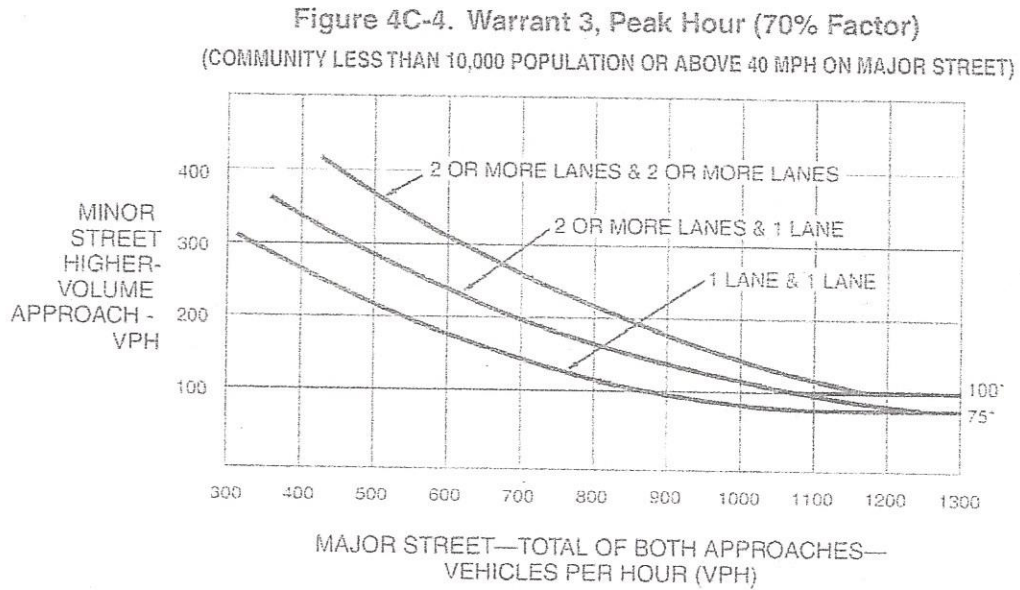
EXIST  
 EPAP  
 EPAP PP CENTENNIAL  
 EPAP PP SR 49  
 CUM  
 CPP CENTENNIAL  
 CPP SR 49

AM	PM
*	*
Δ	Δ
+	+
□	□
○	○
⊗	⊗
†	†

#3 E. BENNETT/  
 TILLOY



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.



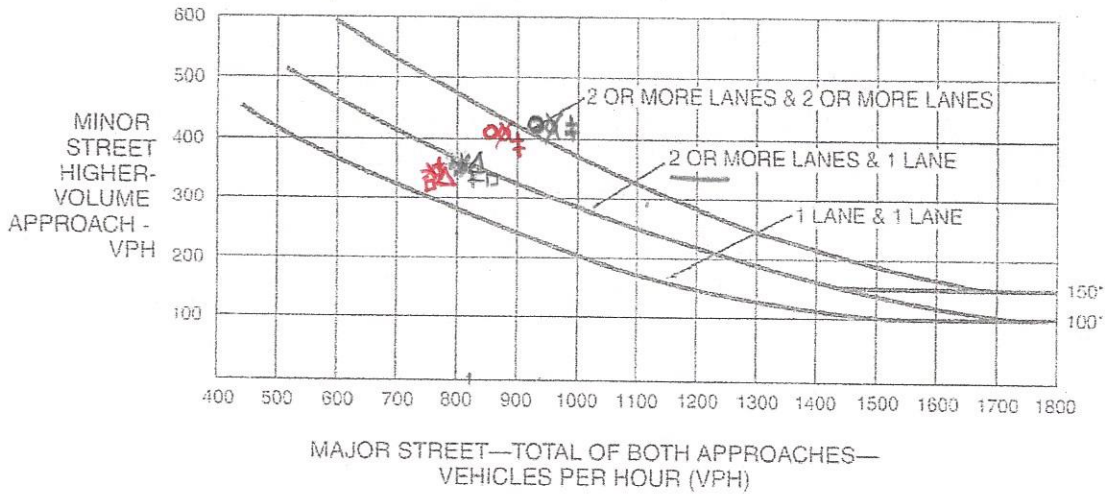
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	6:30 AM	3:30 PM	6:30 PM
EXIST	*	*	*
EPAP	Δ	Δ	Δ
EPAPP CENTENNIAL	+	+	+
EPAPP SR49	□	□	□
CUMULATIVE	○	○	○
CPP CENTENNIAL	⊗	⊗	⊗
CPP - SR49	‡	‡	‡

3, E BENNETT/  
 TINLOV

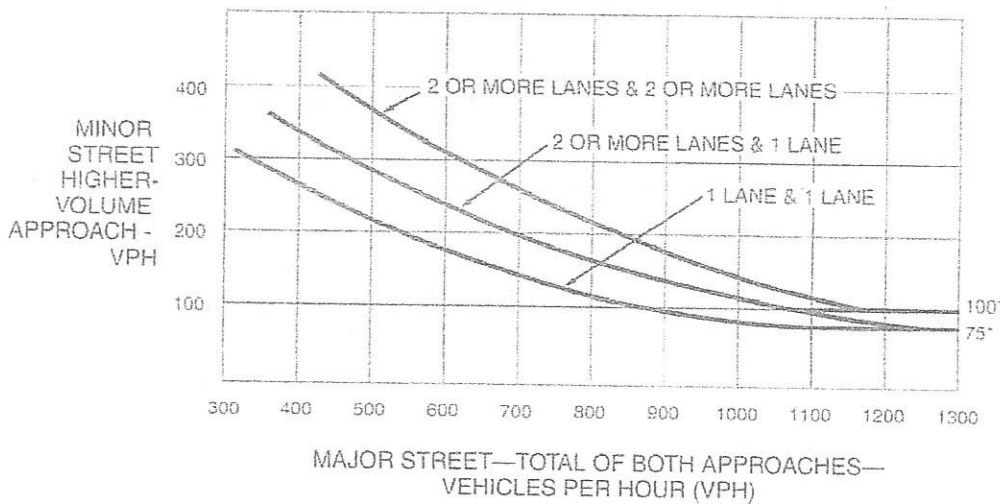


Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

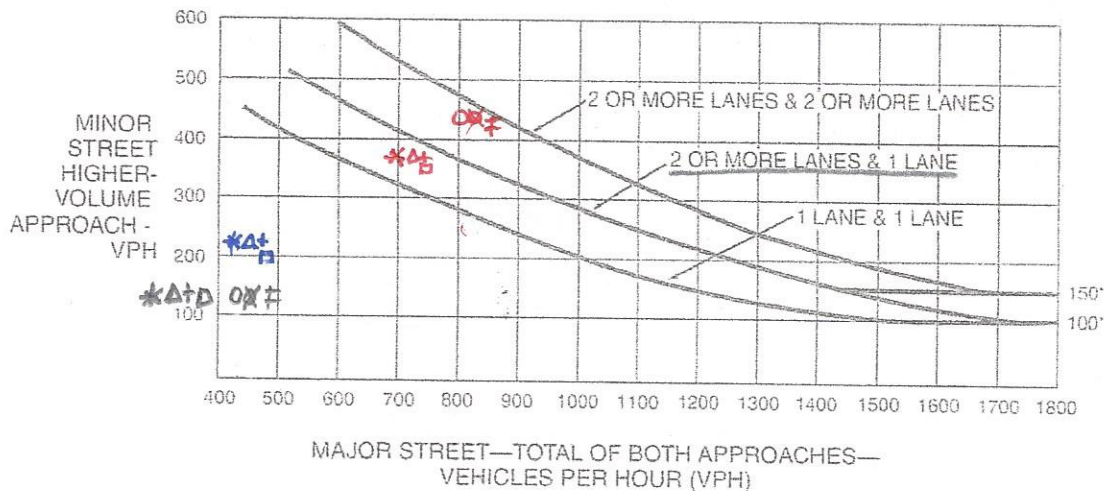


\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	*	*
EPAP	△	△
EPAPP CENTENNIAL	+	+
EPAPP SR49	□	□
CUM	○	○
CPP CENTENNIAL	⊗	⊗
CPP SR49	†	†

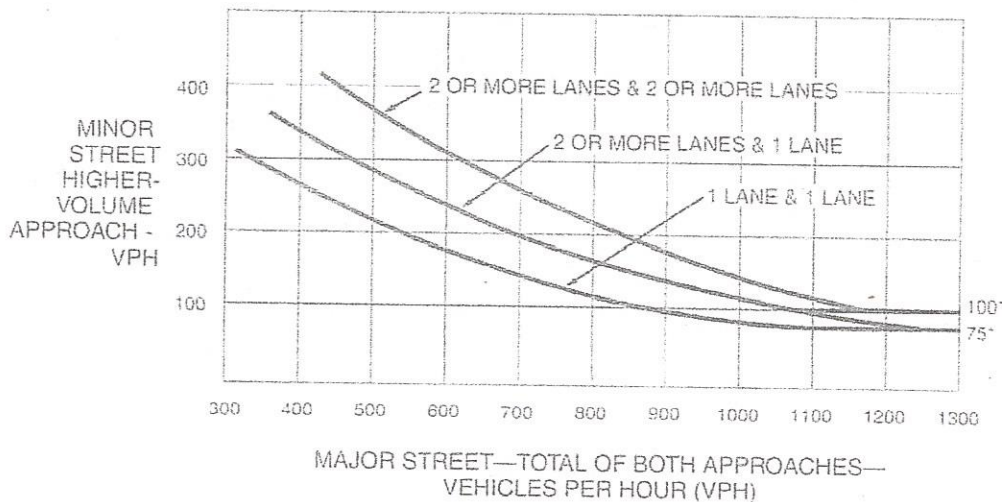
#4 E. BENNETT/  
 HANSEN

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

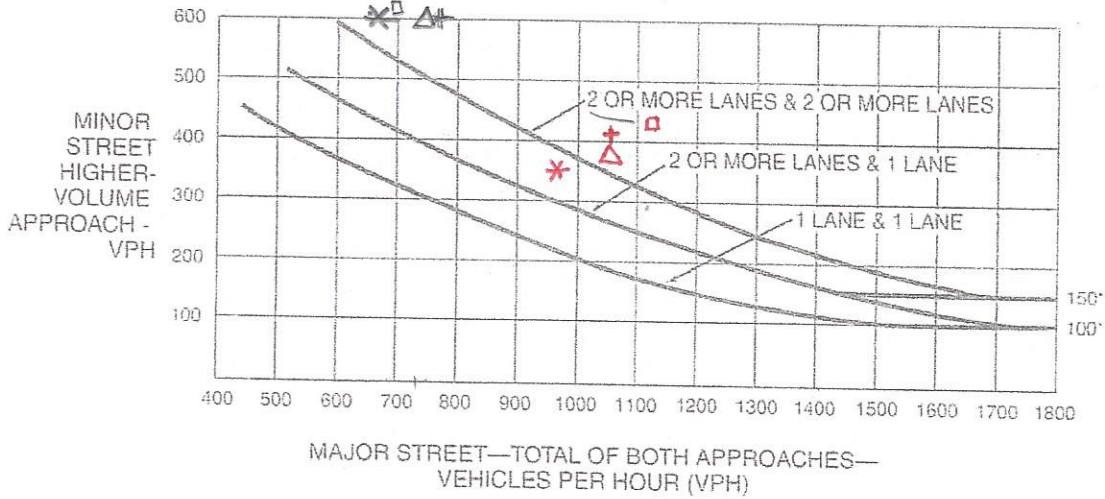
EXIST  
 EPAP  
 EPAPP CENTENNIAL  
 EPAPP SRA9  
 CUMULATIVE -  
 CPP CENTENNIAL  
 CPP SRA9

6:30 AM      3:30 PM      6:30 PM

\*  
 Δ  
 †  
 □  
 ○  
 ✕  
 †

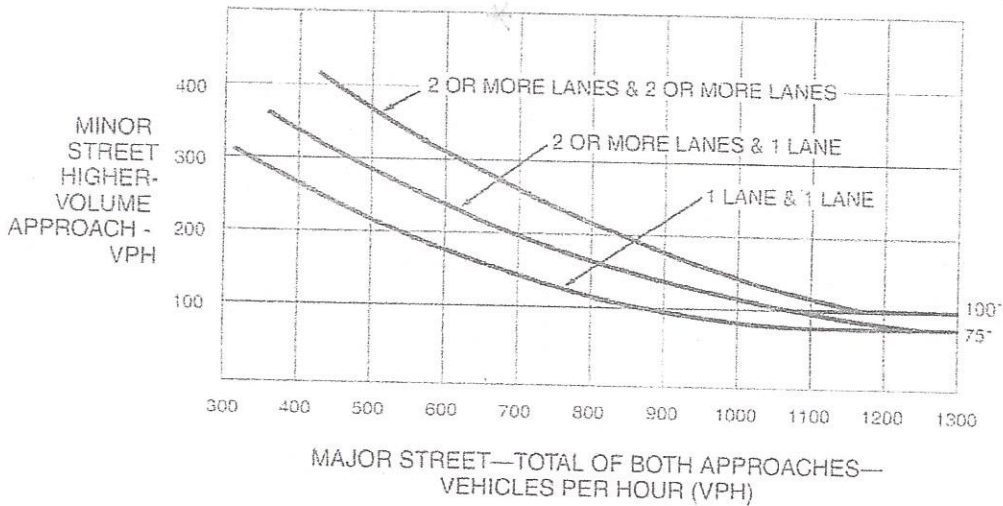
4. E BENNETT/  
 HANSEN

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



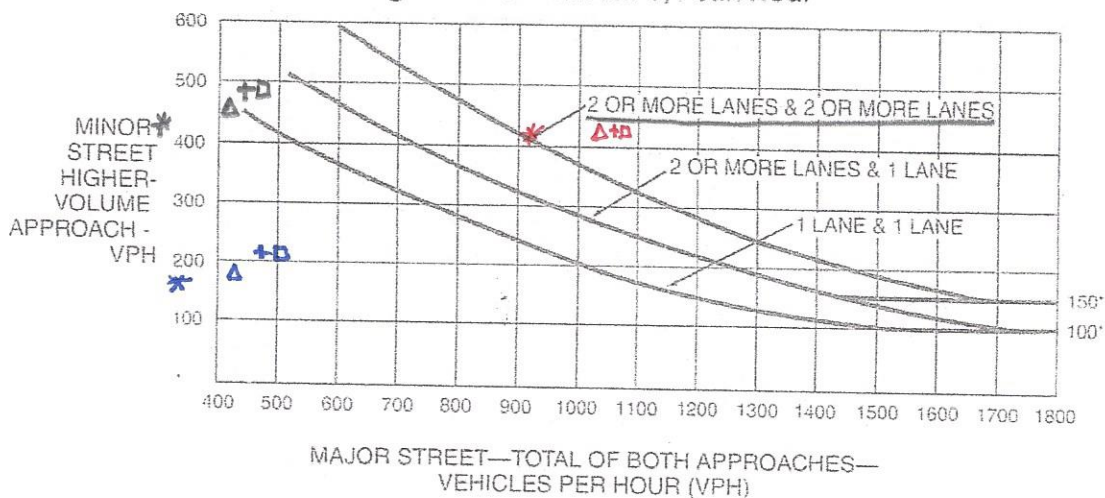
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

EXIST	AM	PM
EPAP	*	*
EPAPP LEFT TURN	△	△
EPAPP SR49	+	+
CUM	□	□
	SIGNALIZED	

#6 IDAHO MARYLAND /  
 SR49/20 EB



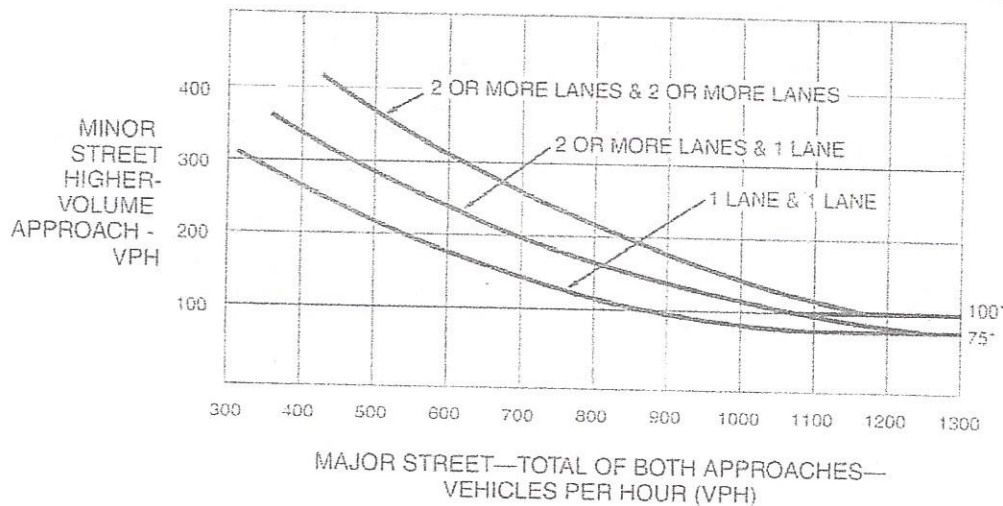
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

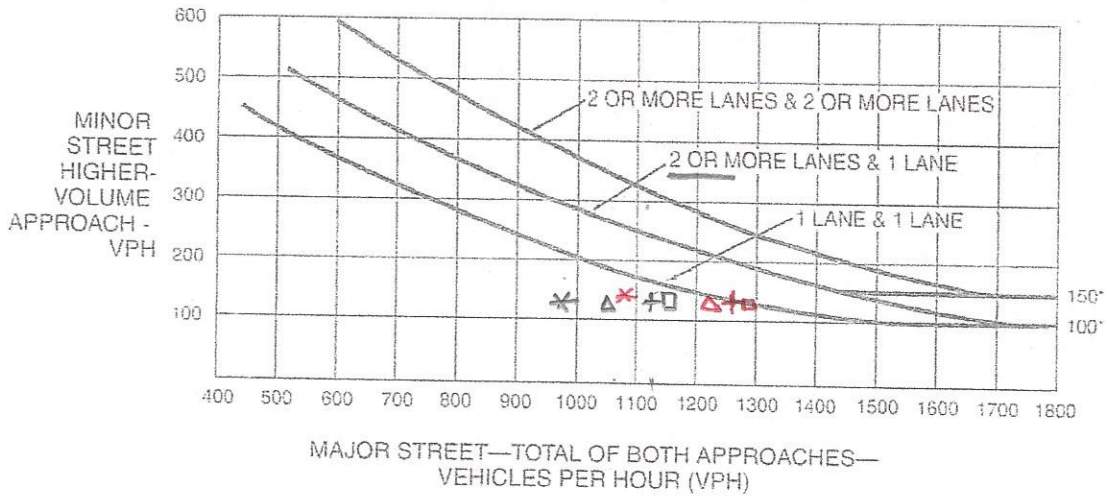
6:30 AM                      3:30 PM                      6:30 PM

EXIST \*  
 EPAP Δ  
 EPAPP CESTERNAL +  
 EPAPP SR49 □  
 CUMULATIVE- SIGNAL

\*  
 Δ  
 +  
 □

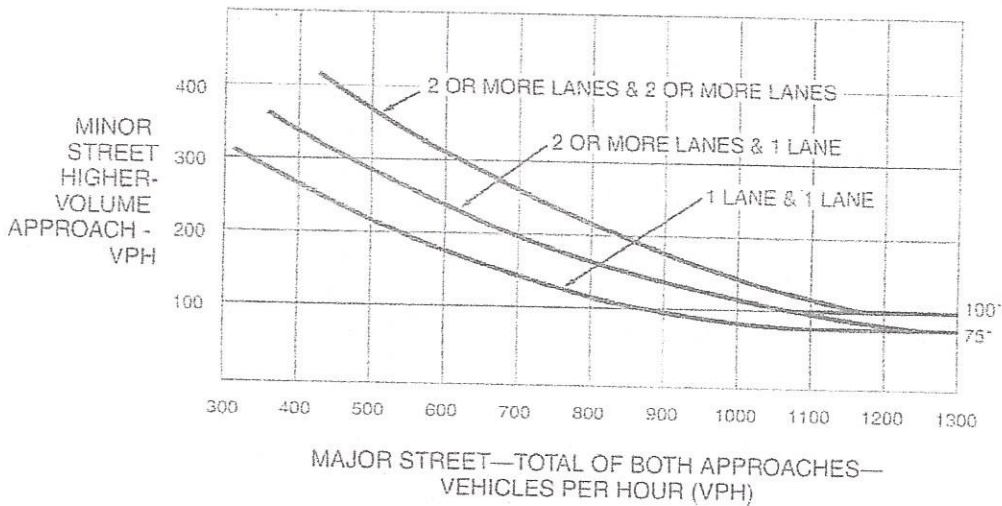
6. IDAHO MARYLAND /  
 SR 49/20 NB RAB

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

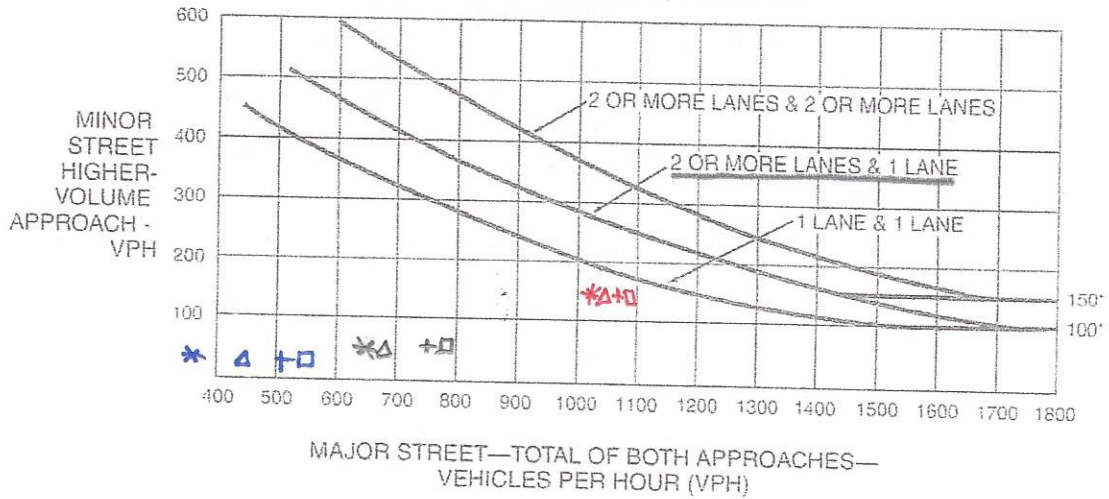


\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	*	*
EPAP	Δ	Δ
EDAPP CENTENNIAL	+	+
EDAPP SR49	□	□
CUM	-- SIGNALIZED	

7. IDAHO MARYLAND / RAILROAD

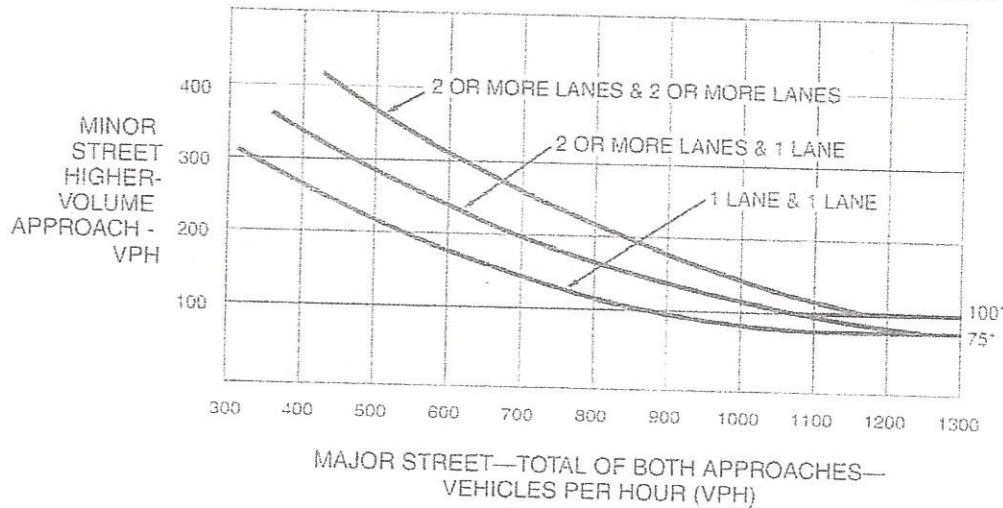
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6:30 AM      3:30 PM      6:30 PM

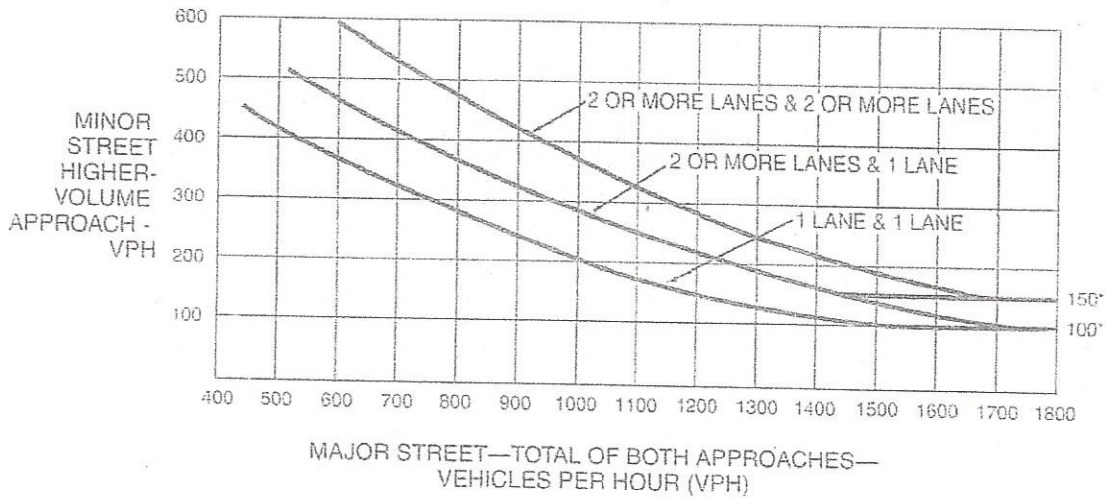
EXIST  
 EPAP  
 EPAPP CENTENNIAL  
 EPAPP SR49  
 CUMULATIVE - SIGNAL

*	*	*
Δ	Δ	Δ
+	+	+
□	□	□

7. IDAHO MARYLAND /  
 RAILROAD



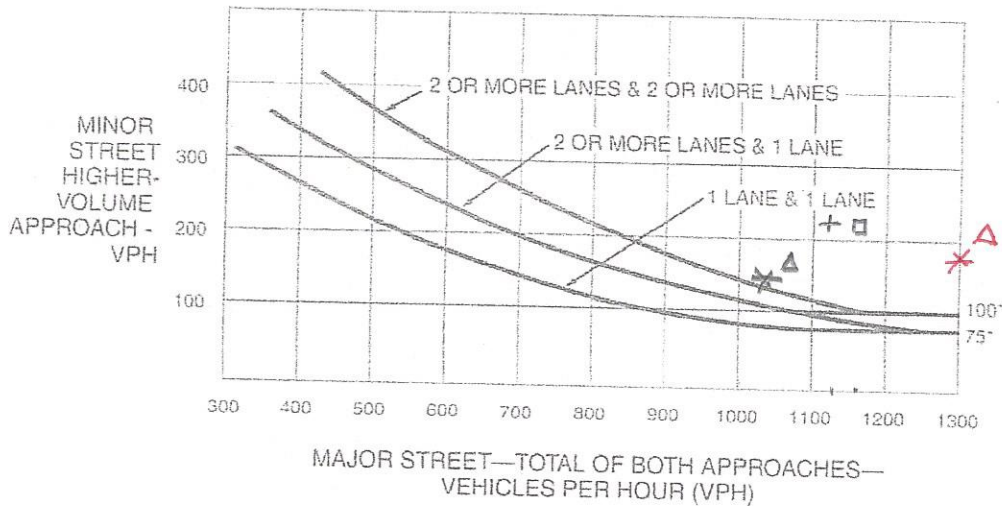
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



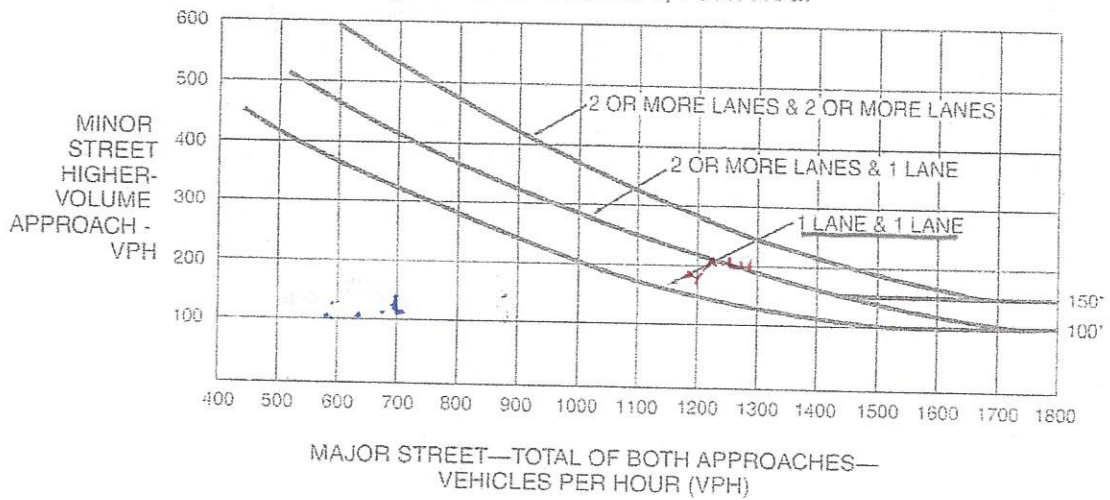
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

EXIST  
 EPDP  
 EPAPP CENTENNIAL  
 EPAPP SR49  
 CUM -- SIGNALIZED

AM	PM
*	*
△	△
+	+
□	□

12, BRUNSWICK/  
 IDAHO MARYLAND

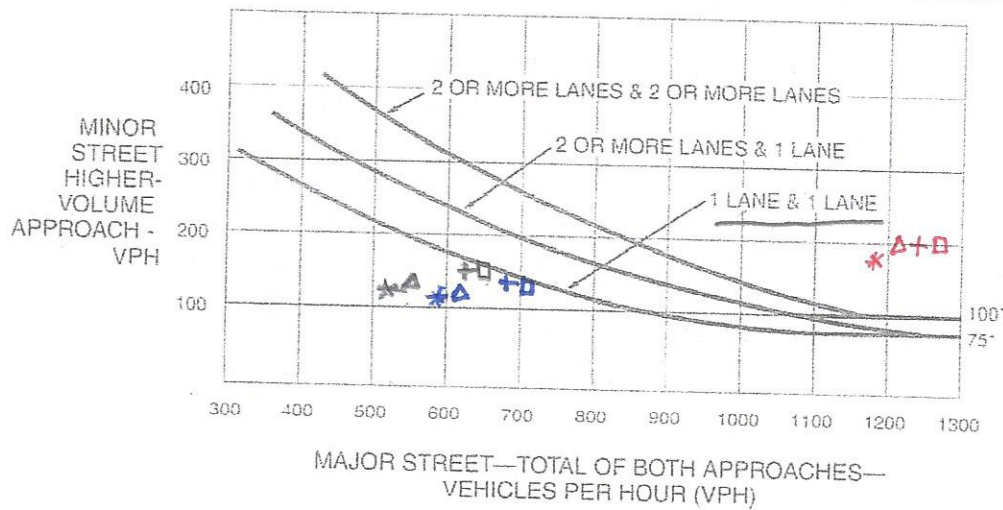
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

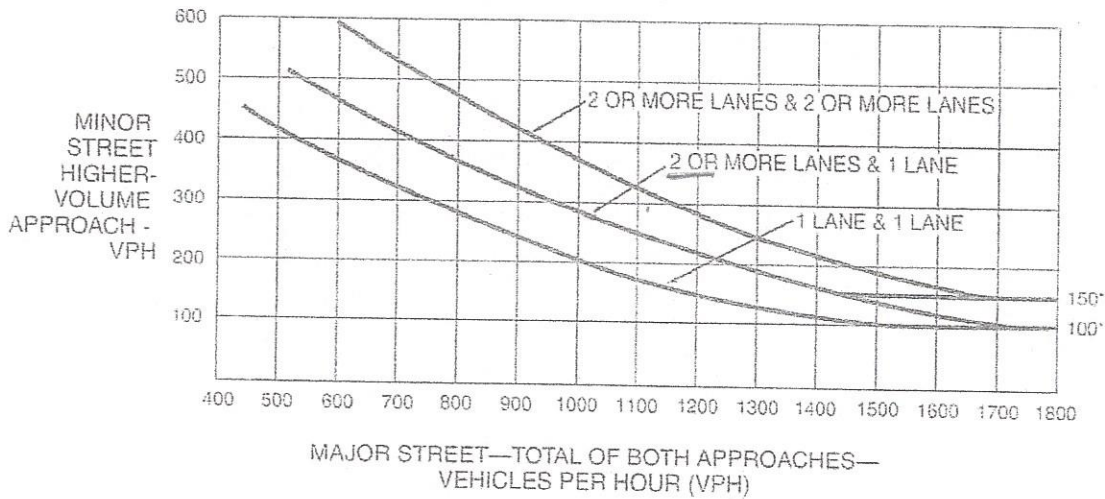
6:30 AM      3:30 PM      6:30 PM

EXIST  
 EPAP  
 EPAPP CENTENNIAL  
 EPAPP SR49  
 CUMULATIVE - SIGNAL

*	*	*
△	△	△
+	+	+
□	□	□

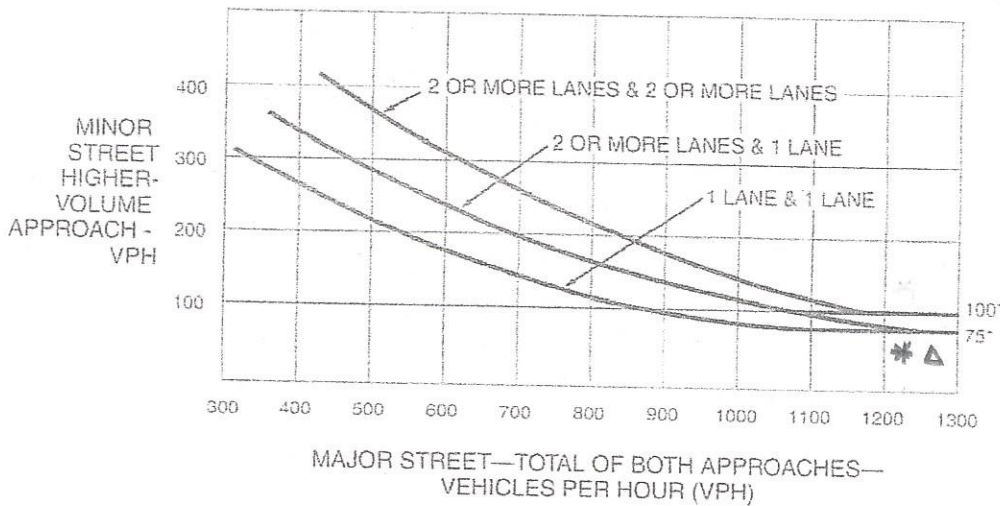
12. BRUNSWICK /  
 IDAHO MARYLAND

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

- EXIST
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- EPAPP CENTENNIAL
- EPAPP SRA9
- CUM
- CPP CENT
- CPP SRA9

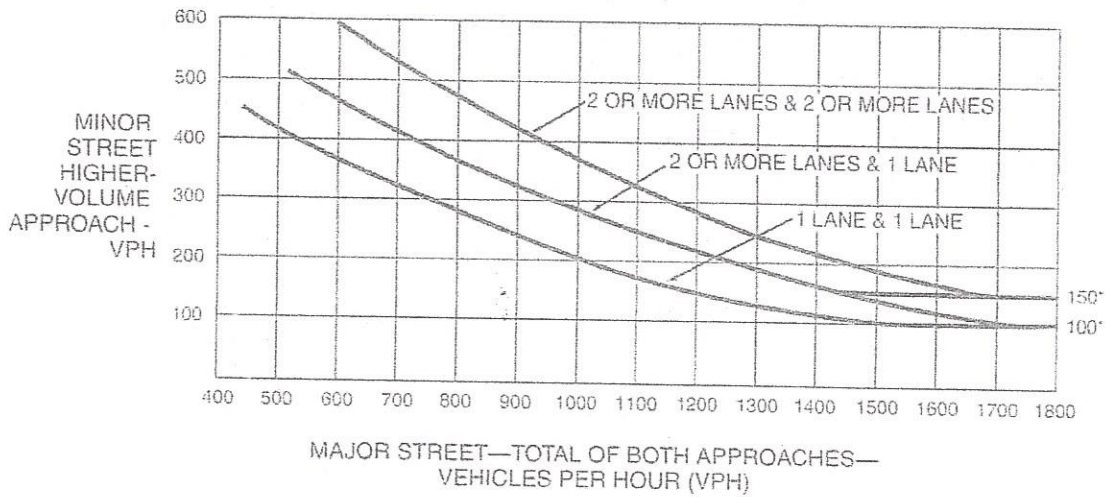
- |    |    |
|----|----|
| AM | PM |
| *  | *  |
| △  | △  |
| +  | +  |
| □  | □  |
| ○  | ○  |
| ⊗  | ⊗  |
| ◊  | ◊  |

✓  
 \*A + □ □  
 + □ □ □

13. BRUNSWICK/  
 WHISPERING PINES

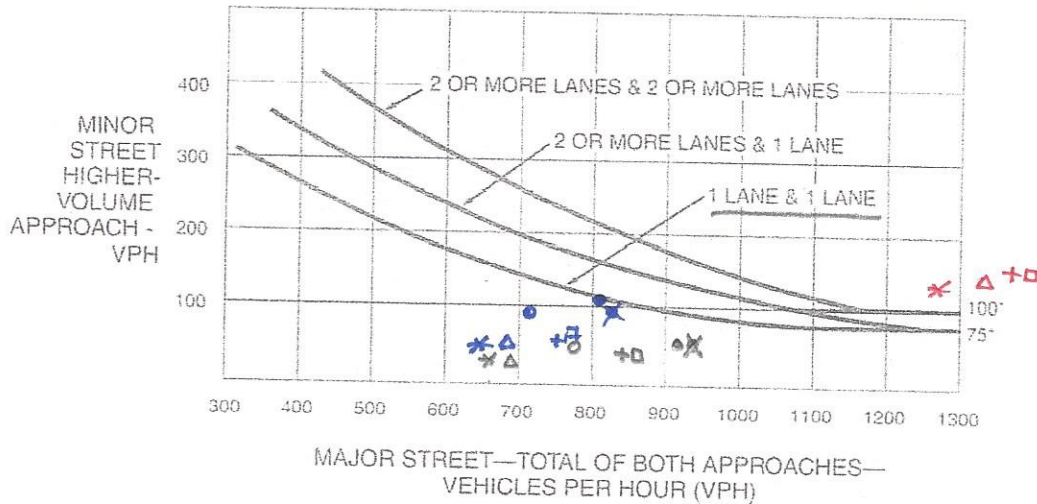


Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



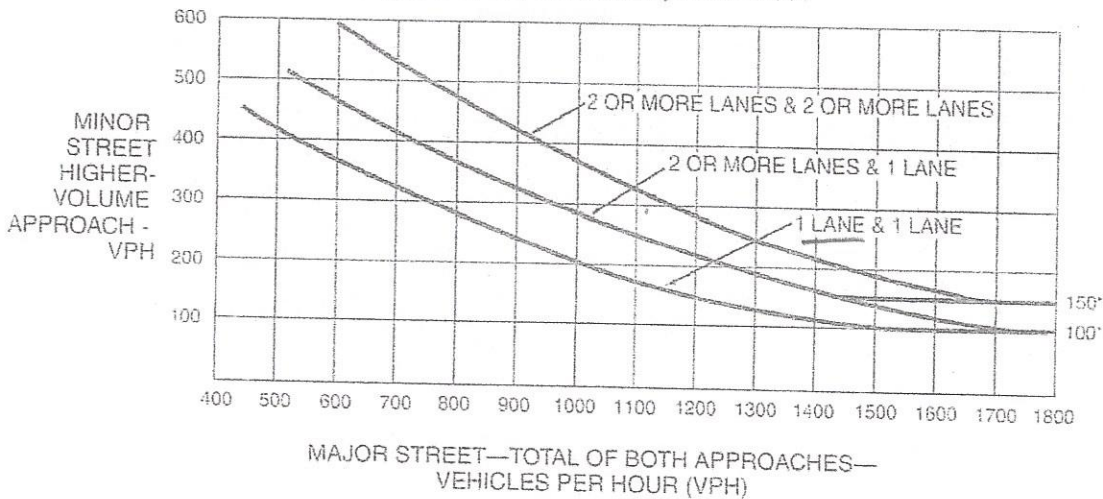
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

- EXIST.
- EPAP
- EPAPPP CENTENNIAL
- EPAPPP SR 49
- CUM
- CPP CENTENNIAL
- CPP SR 49

	6 <sup>30</sup> AM	3 <sup>30</sup> PM	6 <sup>30</sup> PM
*	*	*	*
Δ	Δ	Δ	Δ
+	+	+	+
□	□	□	□
○	○	○	○
X	X	X	X

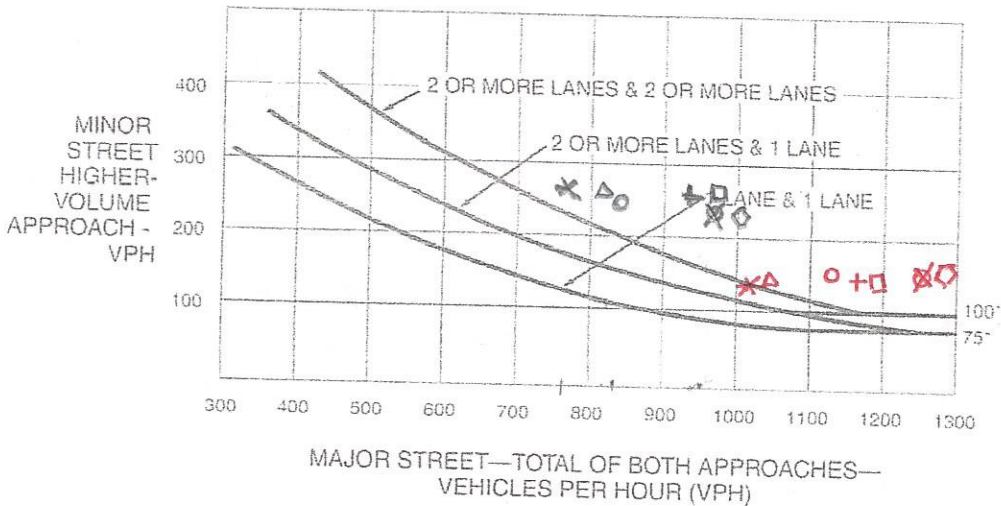
13. BRUNSWICK/  
 WHISPERING PINES

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

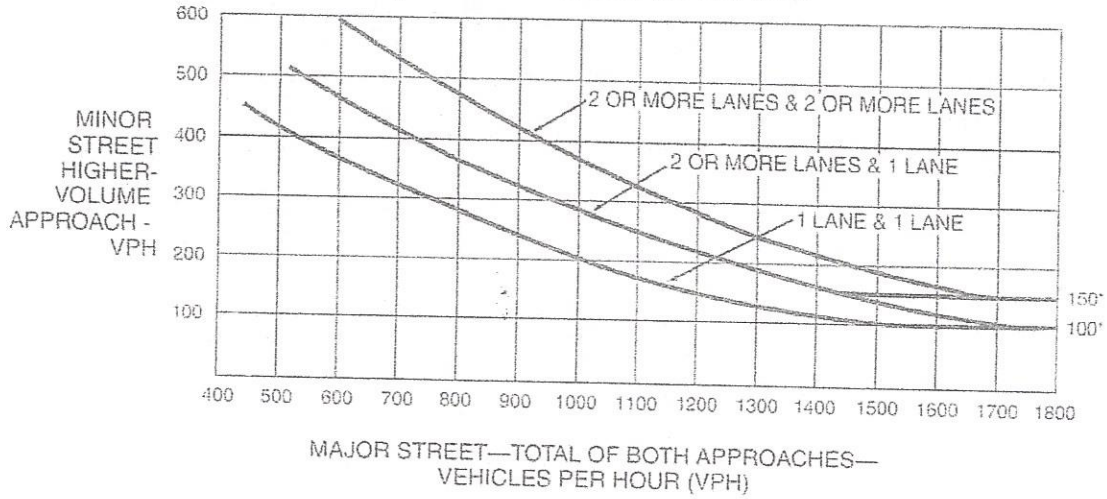
- EAST
- BPAP
- EPAPP CENTENNIAL
- EPAPP SR49
- CUM
- CPP CENT
- CPP SR49

- |    |   |    |   |
|----|---|----|---|
| AM | * | PM | * |
|    | △ |    | △ |
|    | + |    | + |
|    | □ |    | □ |
|    | ○ |    | ○ |
|    | ⊗ |    | ⊗ |
|    | ⊙ |    | ⊙ |

14. BRUNSWICK/  
 E. BENNETT

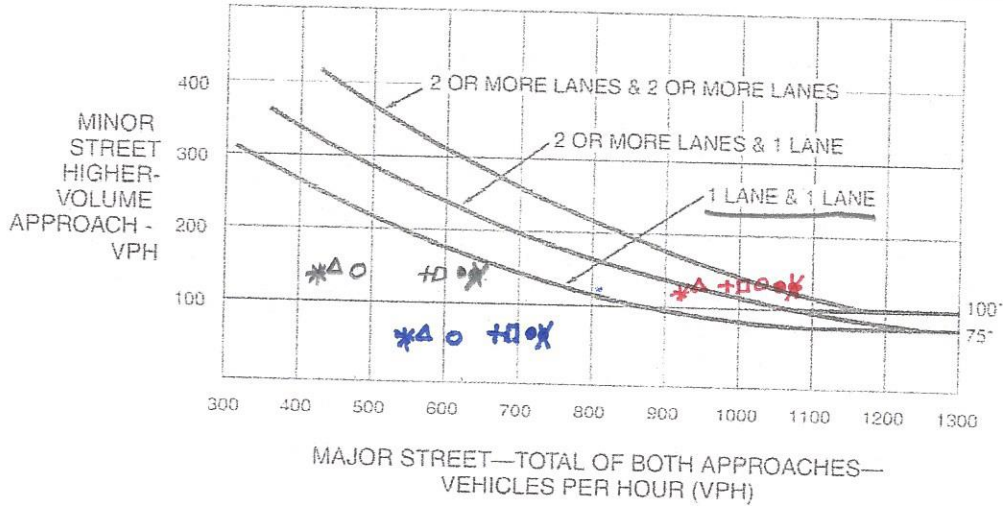


Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

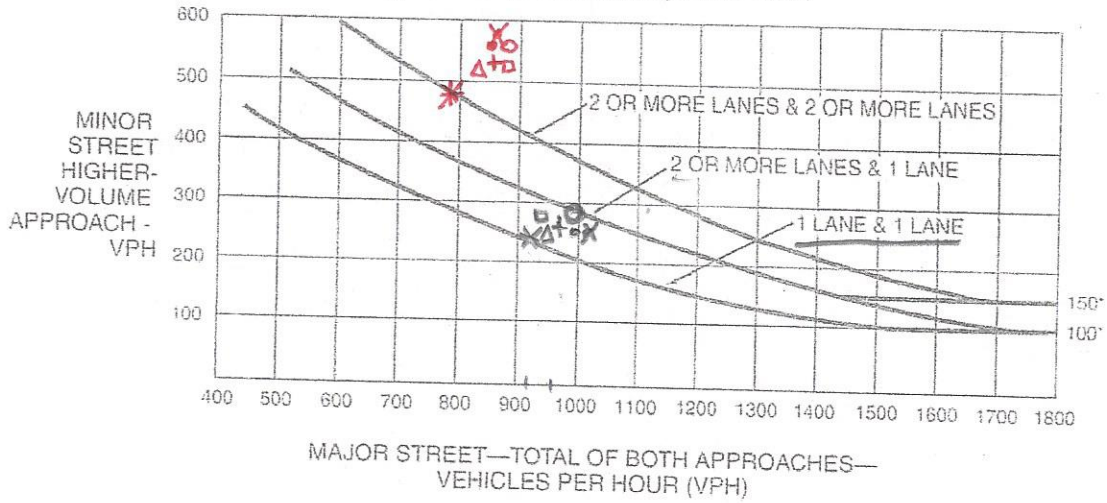
6:30 AM . 3:30 PM 6:30 PM

EXIST  
 EPAP  
 EPAPP CENTENNIAL  
 EPAPP SR49  
 CUM  
 CPP CENTENNIAL  
 CPP SR49

*	*	*
Δ	Δ	Δ
+	+	+
□	□	□
○	○	○
•	•	•
x	x	x

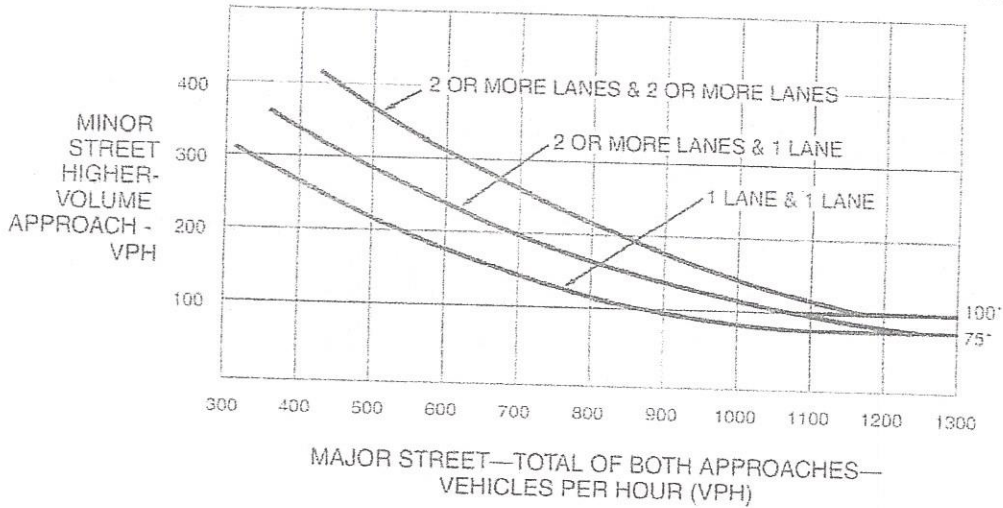
14. BRUNSWICK/  
 E. BENNETT

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



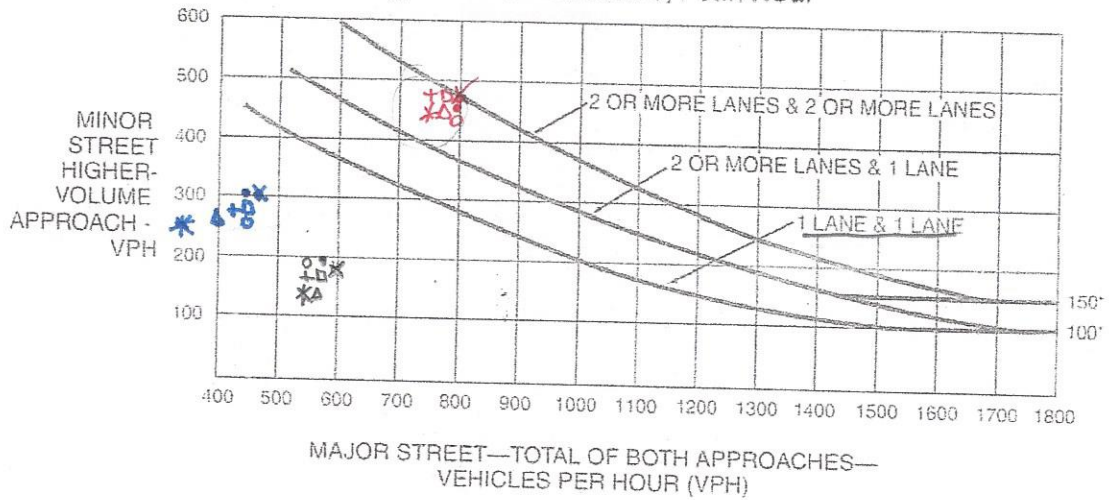
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

- EXIST
- BPAP
- EPAPP CENTENNIAL
- EPAPP SRA9
- CUM
- CUM CENTENNIAL
- CUM SRA9

- |    |    |
|----|----|
| AM | PM |
| *  | *  |
| △  | △  |
| +  | +  |
| □  | □  |
| ○  | ○  |
| ●  | ●  |
| ×  | ×  |

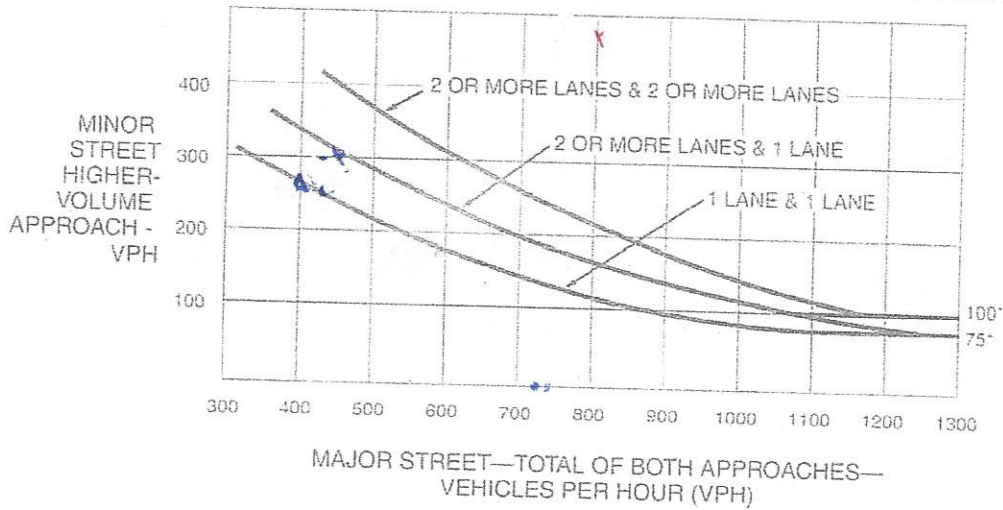
15. BRUNSWICK/  
 SR 174

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

- EXIST
- EPNP
- EPAPP CENTENNIAL
- EPAPP SR49
- CUM
- CPP CENTENNIAL
- CPP SR49

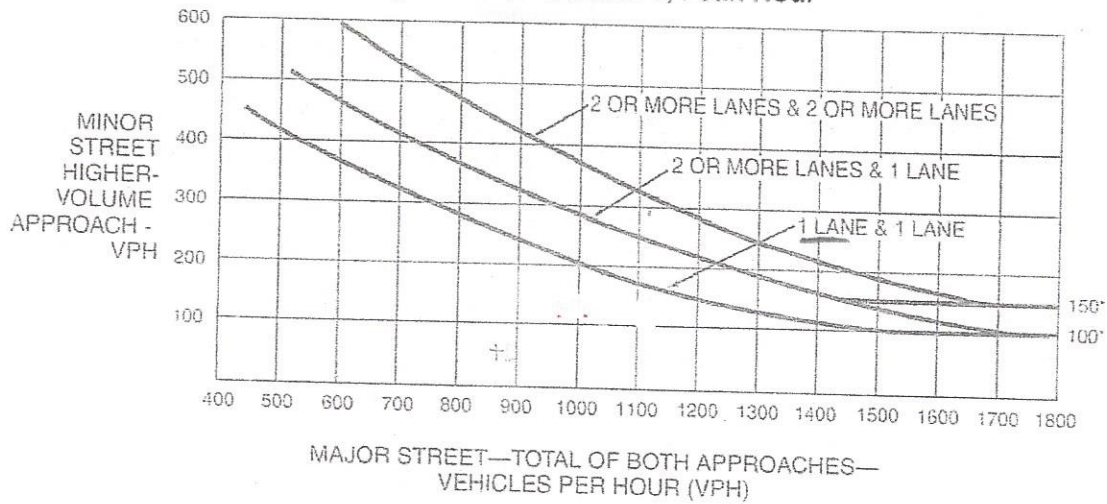
6:30 AM      3:30 PM      6:30 PM

- |   |   |   |
|---|---|---|
| * | * | * |
| Δ | Δ | Δ |
| + | + | + |
| □ | □ | □ |
| ○ | ○ | ○ |
| ● | ● | ● |
| X | X | X |

15. BRUNSWICK/  
 SR174



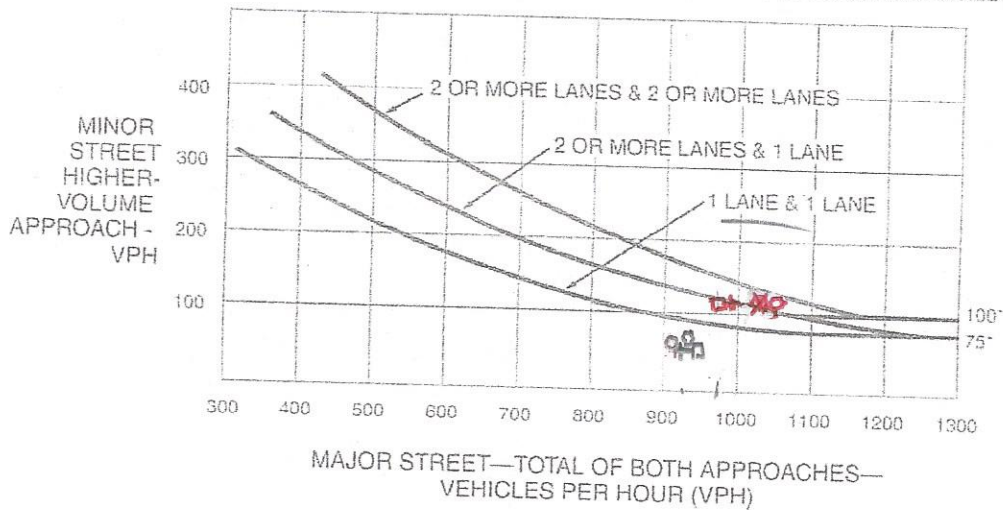
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

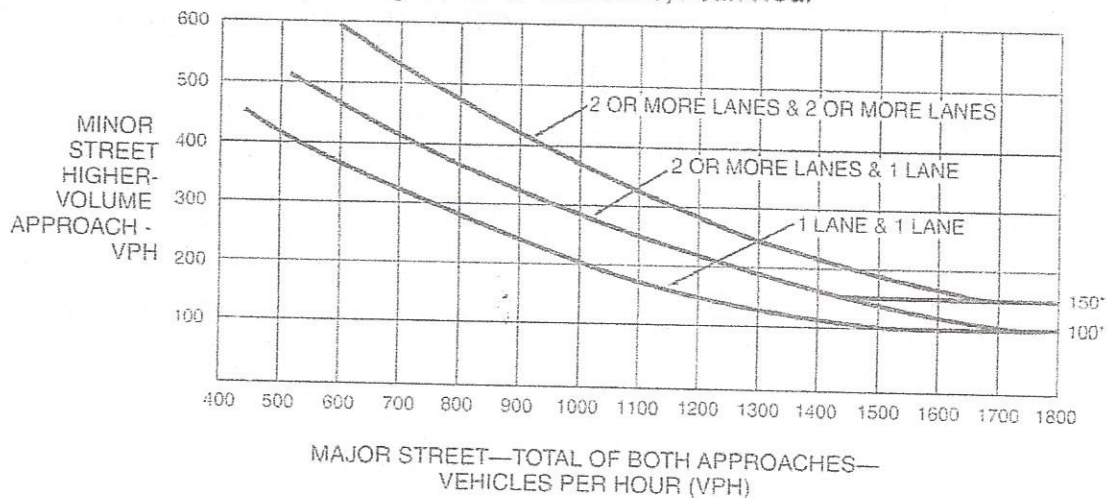


\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EPAPP CENTENNIAL	+	+
EPAPP SR49	□	□
CPP CENT	⊗	⊗
CPP SR49	◊	◊

16. BRUNSWICK/  
 PROJ. DRIVEWAY

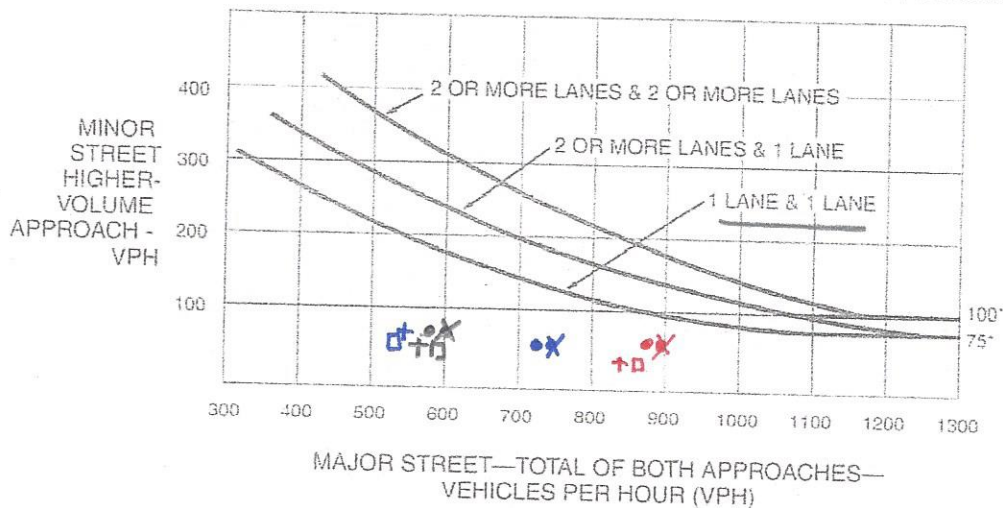
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



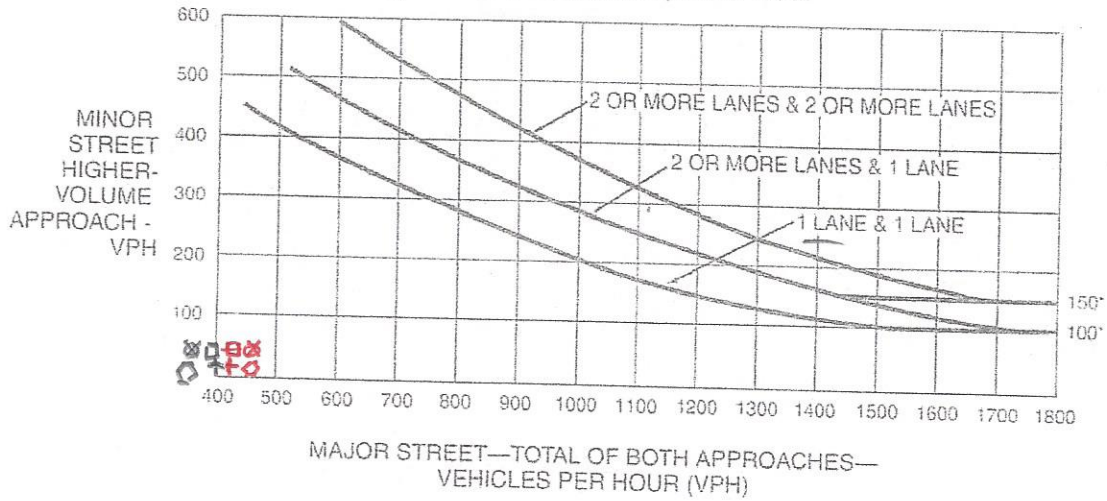
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6<sup>30</sup> AM 3<sup>30</sup> PM 6<sup>30</sup> PM

EPAPP CENTENNIAL	+	+	+
EPAPP SR49	□	□	□
CPD CENTENNIAL	•	•	•
CPD SR49	X	X	X

16. BRUNSWICK/  
DRIVEWAY

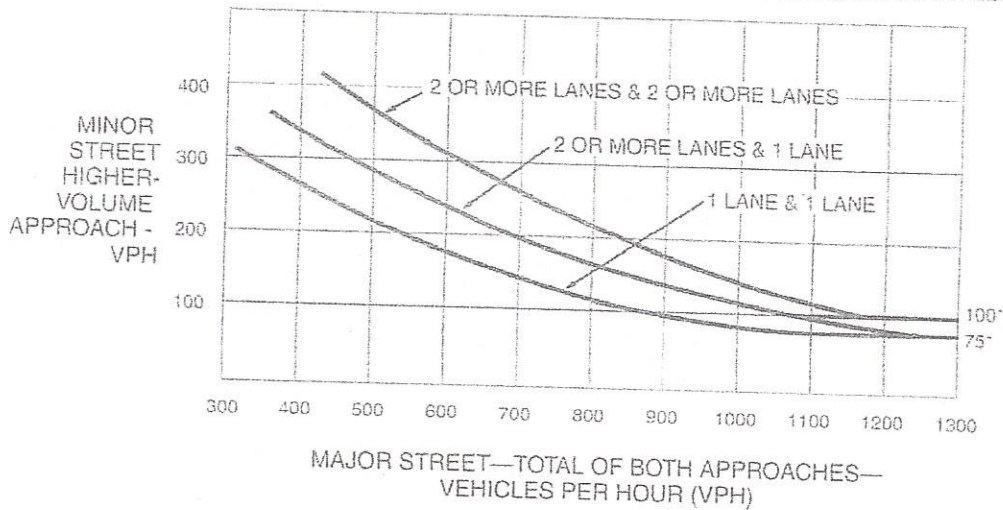
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

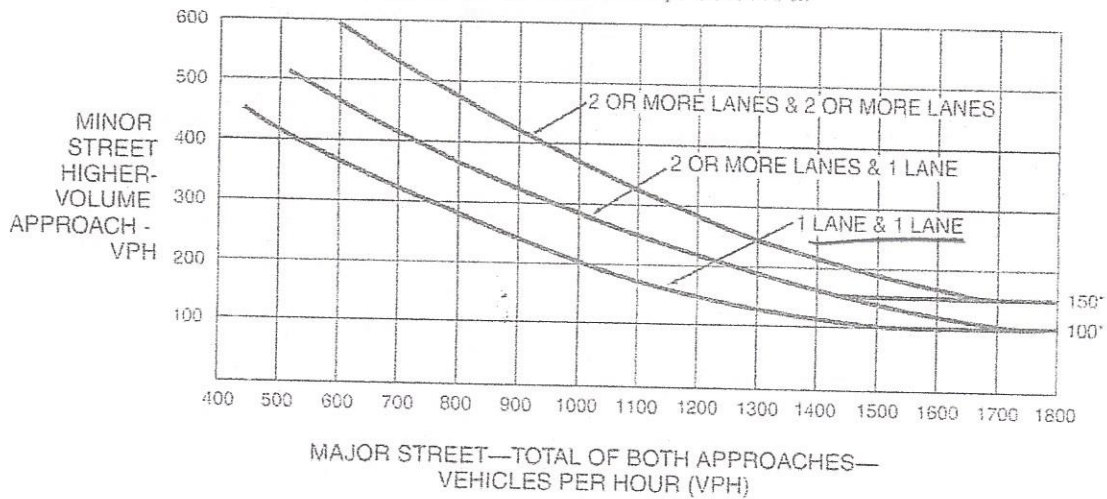
AM PM

EPAPP CENTENNIAL	+	+
EPAPP SR49	□	□
CPP CENT	⊗	⊗
CPP SR49	⊙	⊙

17, E BENNETT/  
 PROJ. DRIVEWAY  
 November 7, 2014



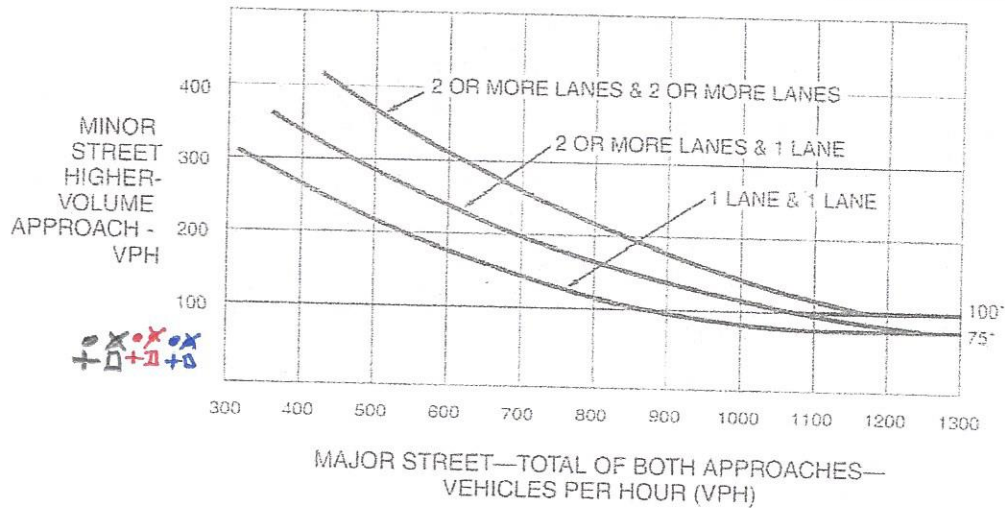
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



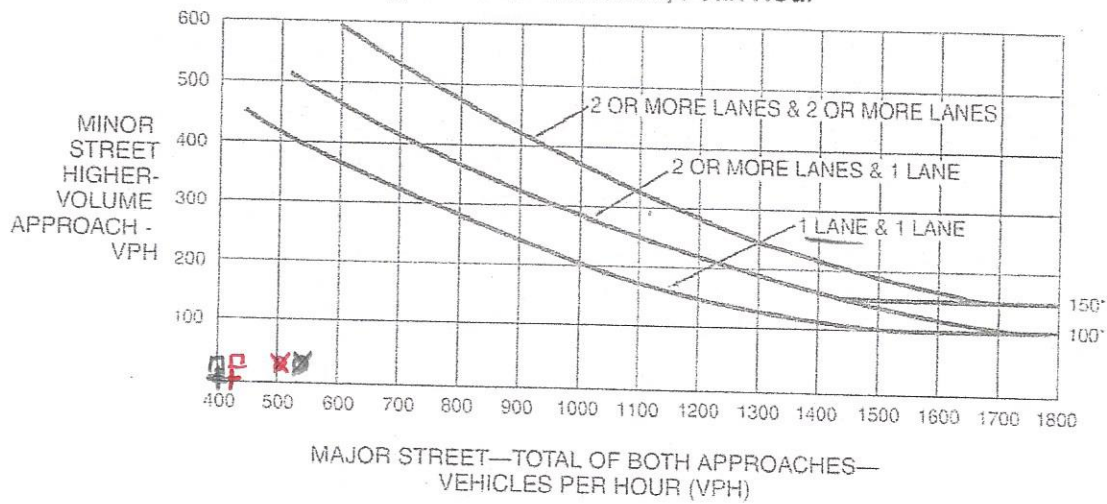
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6:30 AM 3:30 PM 6:30 PM

EPAPP CENTENNIAL	+	+	+
EPAPP SR49	□	□	□
CPP CENTENNIAL	●	●	●
CPP SR49	×	×	×

17. E. BENNETT/  
DRIVEWAY

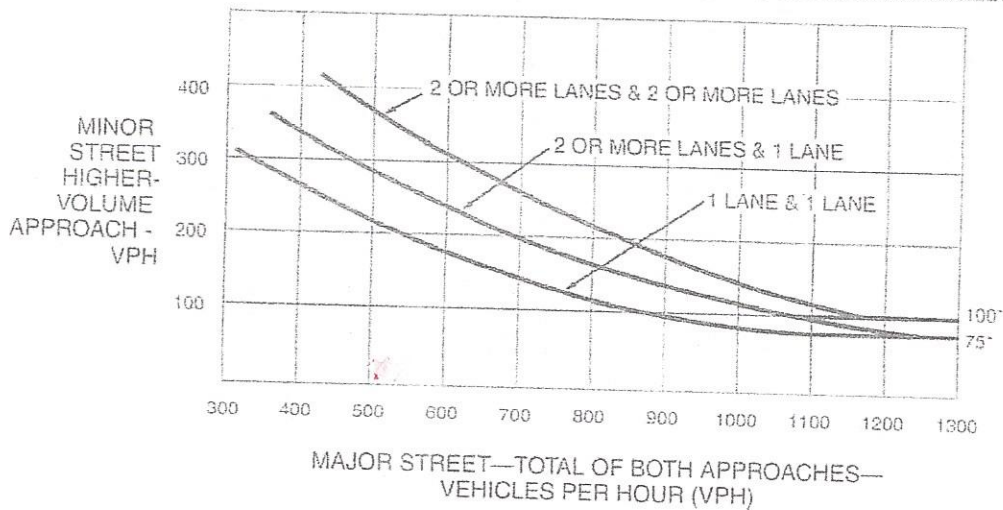
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

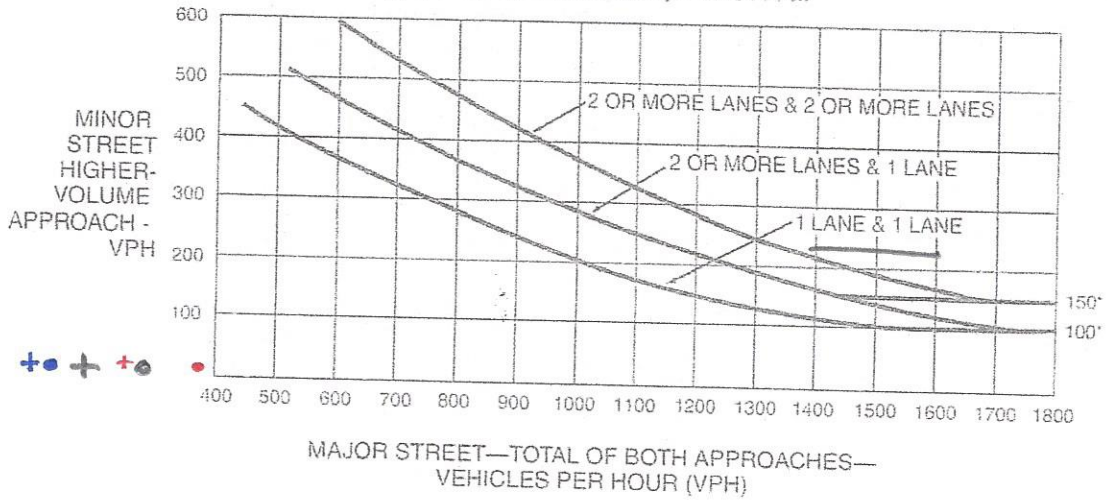
	AM	RM
EPAPP CENT	+	+
CPP CENT	X	X

18. WHISPERING PINES)  
 PROJ. DRIVEWAY

November 7, 2014



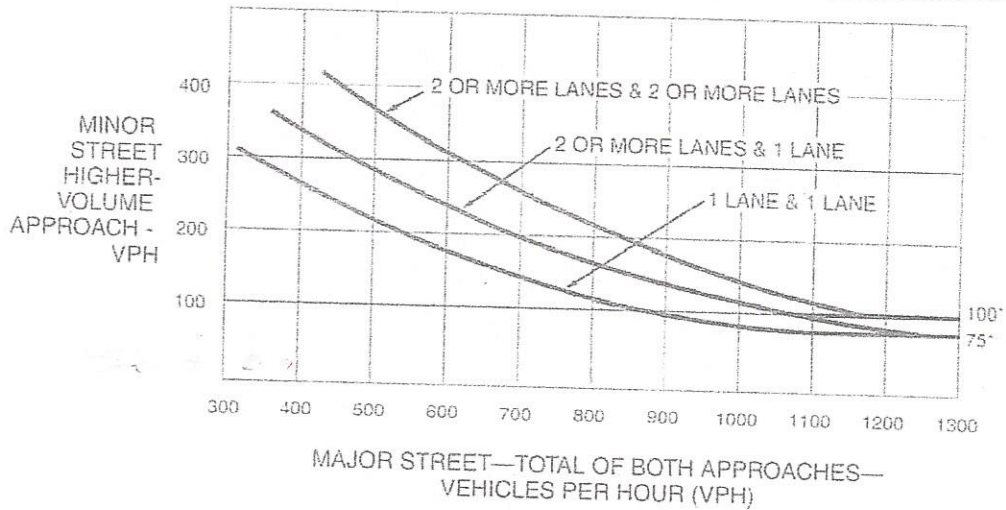
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

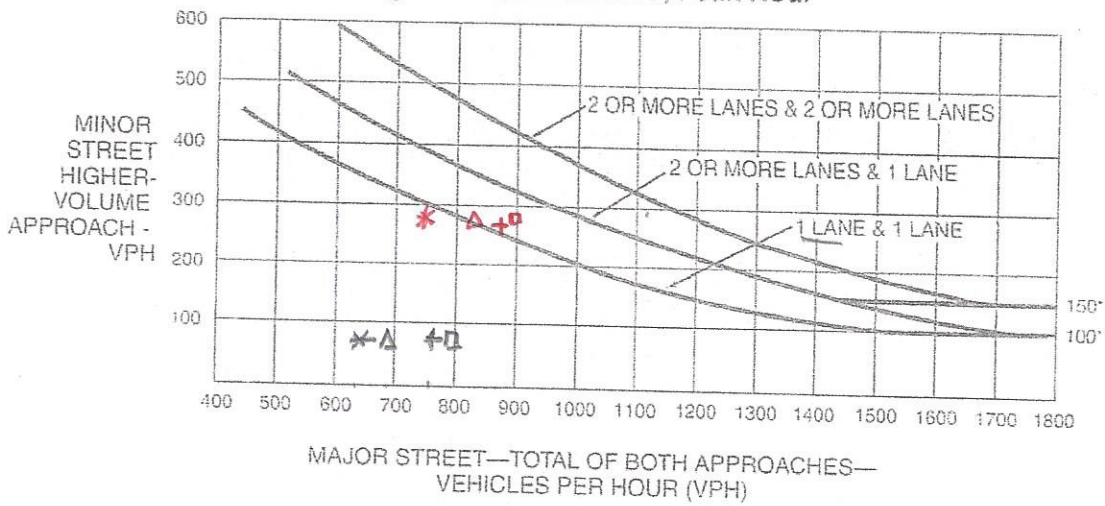
6:30 AM    3:30 PM    6:30 PM

EPAPPP CENTENNIAL    +    +    +

CPP CENTENNIAL    ●    ●    ●

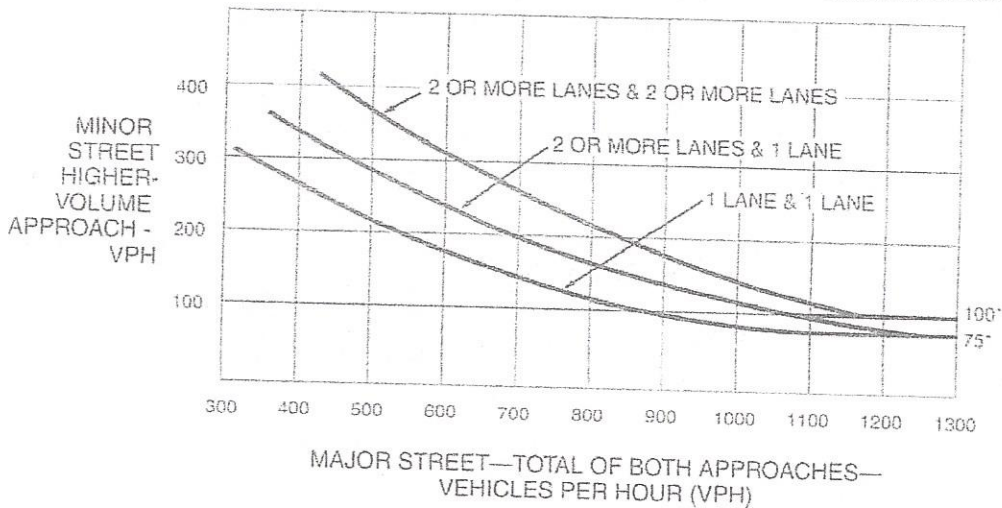
18. WHISPERING PINES  
 DRIVEWAY

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



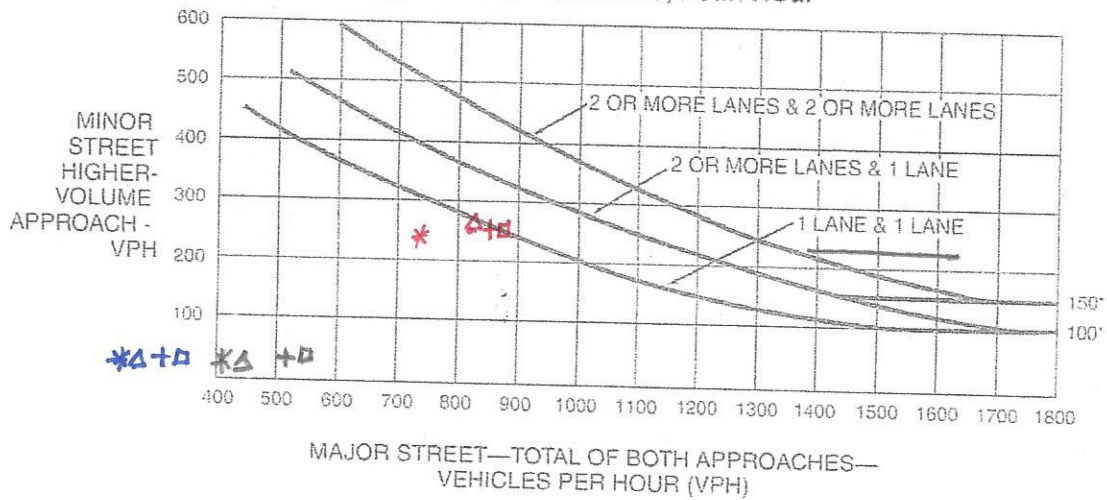
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

EXIST  
 EPAD  
 EPAPP CENTENNIAL  
 EPAPP SR44  
 CUM - - SIGNALIZED

AM	PM
*	*
Δ	Δ
+	+
□	□

19. IDAHO MARYLAND/  
 CENTENNIAL

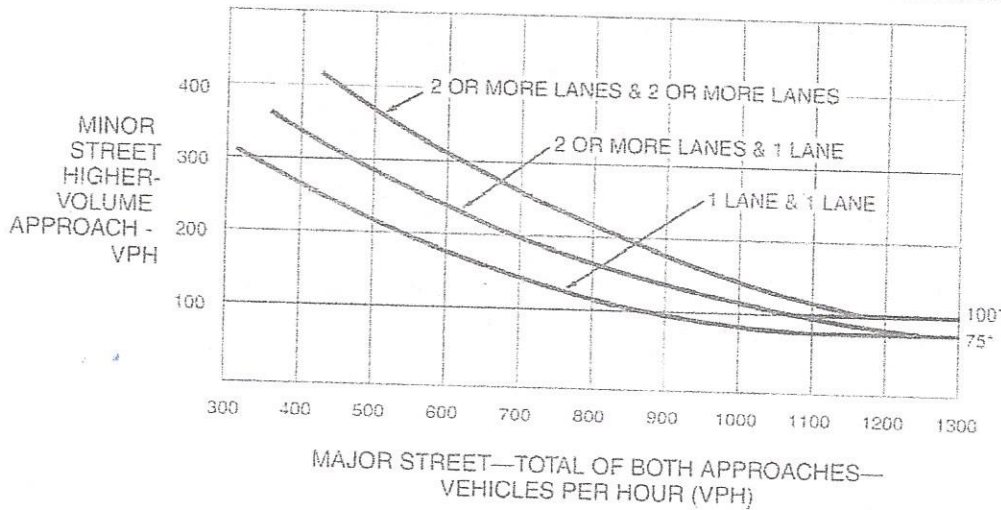
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6:30 AM 3:30 PM 6:30 PM

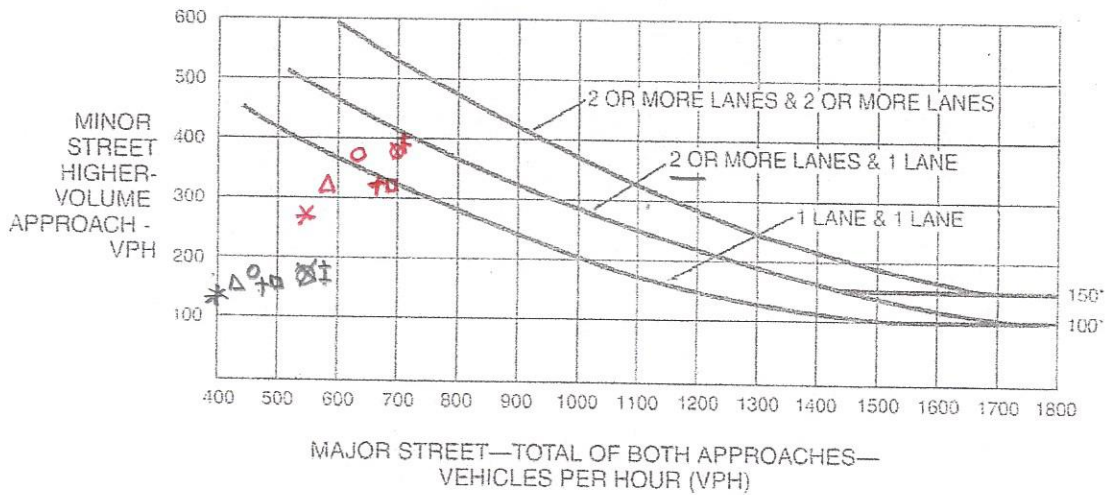
EXIST  
 EPAP  
 EPAPP CENTENNIAL  
 EPAPP SRA9  
 CUMULATIVE - SIGNAL

*	*	*
Δ	Δ	Δ
+	+	+
□	□	□

19. IDAHO MARYLAND/  
 CENTENNIAL



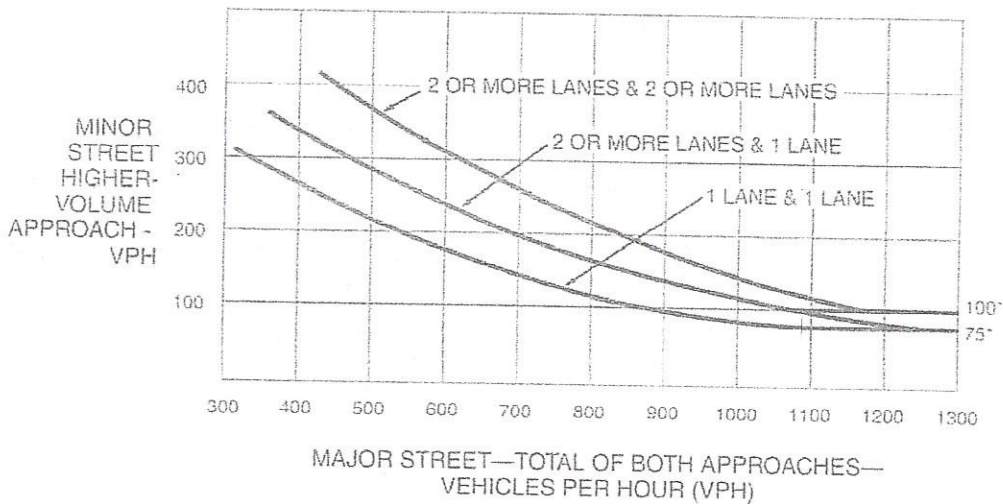
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

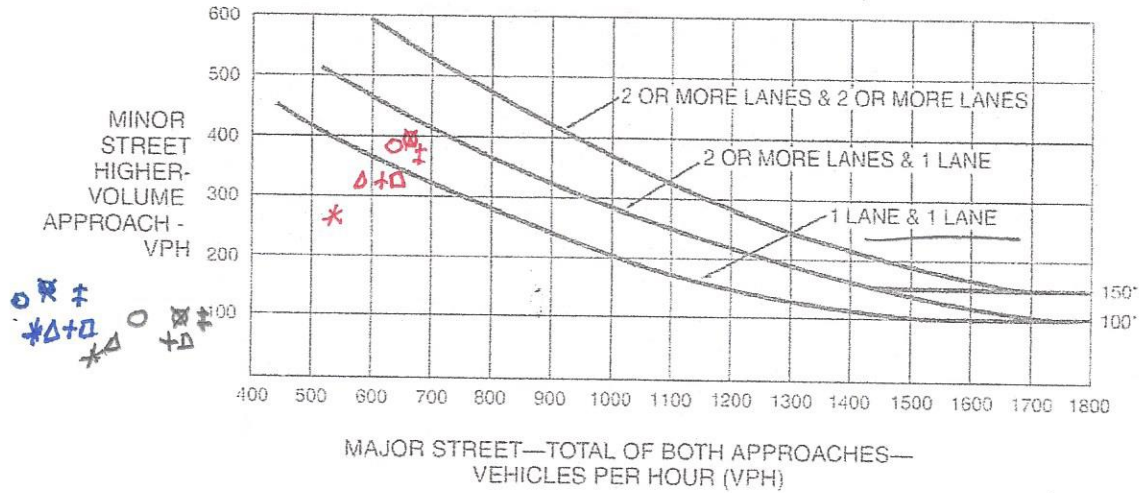


\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	*	*
EPAP	Δ	Δ
EPAPP CENTENNIAL	+	+
EPAPP SR49	□	□
CUM	○	○
CPP CENTENNIAL	⊗	⊗
CPP SR49	‡	‡

20. IDAHO MARYLAND/  
 SUTTON

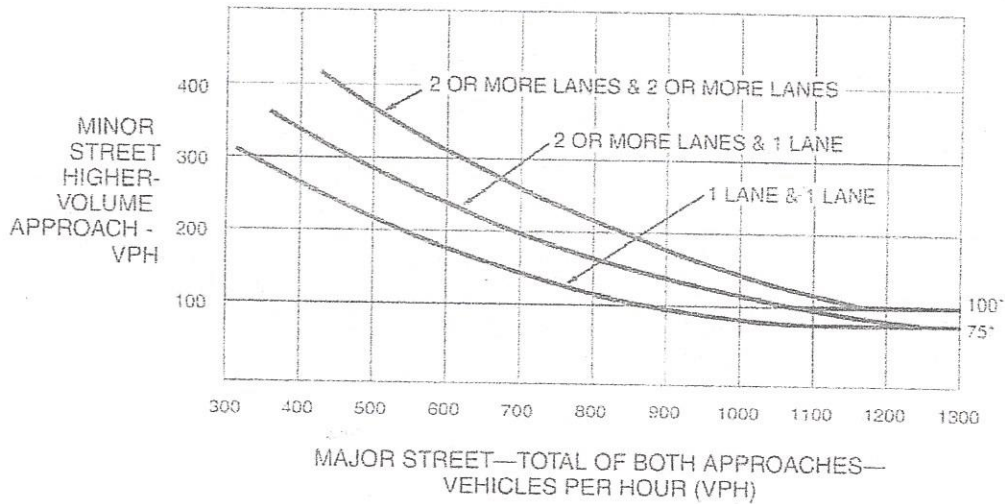
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

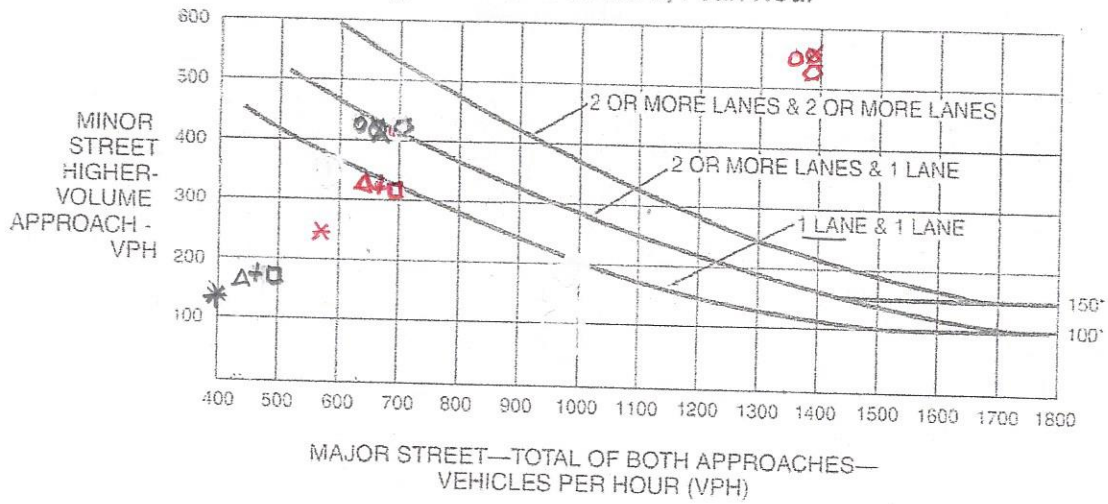


\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	6 <sup>30</sup> AM	3 <sup>30</sup> PM	6 <sup>30</sup> PM
EXIST	*	*	*
EPAP	Δ	Δ	Δ
EPAPP CENTENNIAL	+	+	+
EPAPP SR49	□	□	□
CUMULATIVE	○	○	○
CPP CENTENNIAL	⊗	⊗	⊗
CPP-SR49	‡	‡	‡

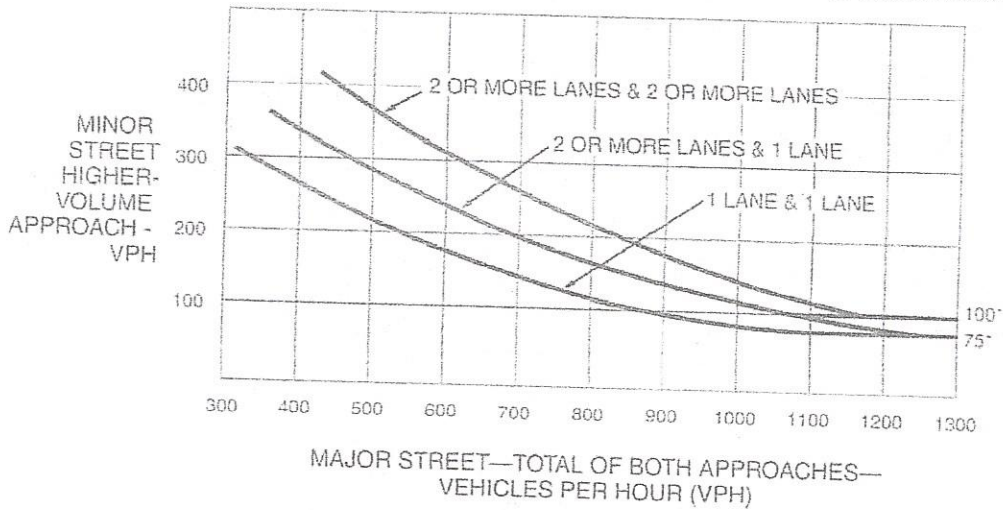
20. IDAHO MARYLAND  
 SUTTON

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)  
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



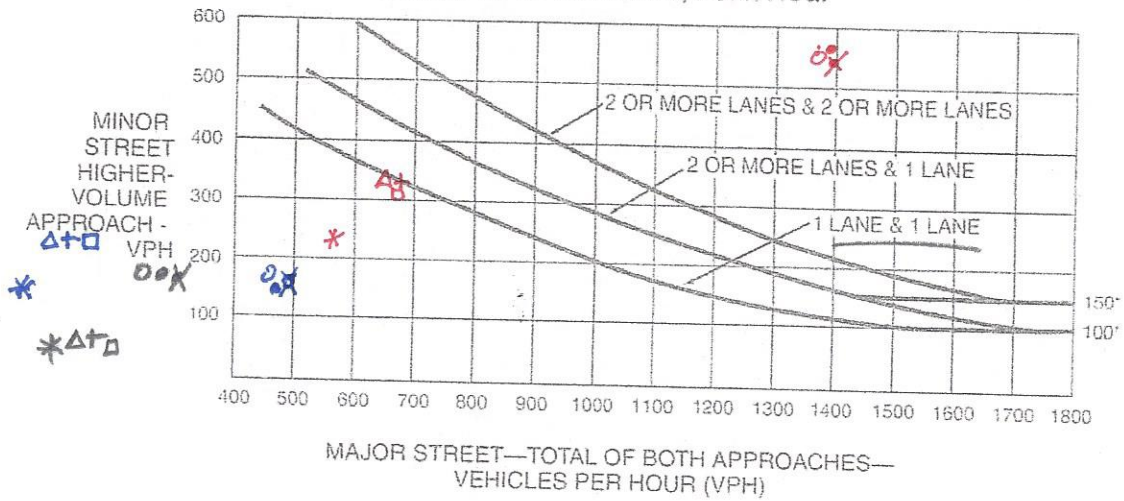
\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

- |                  |    |    |
|------------------|----|----|
|                  | AM | PM |
| EXIST            | *  | *  |
| EPAP             | Δ  | Δ  |
| EPAPP CENTENNIAL | +  | +  |
| EPAPP SR49       | □  | □  |
| CUM              | ○  | ○  |
| CPP CENT         | ⊗  | ⊗  |
| CPP SR49         | ⊙  | ⊙  |

21. SUTTON/  
DORSEY



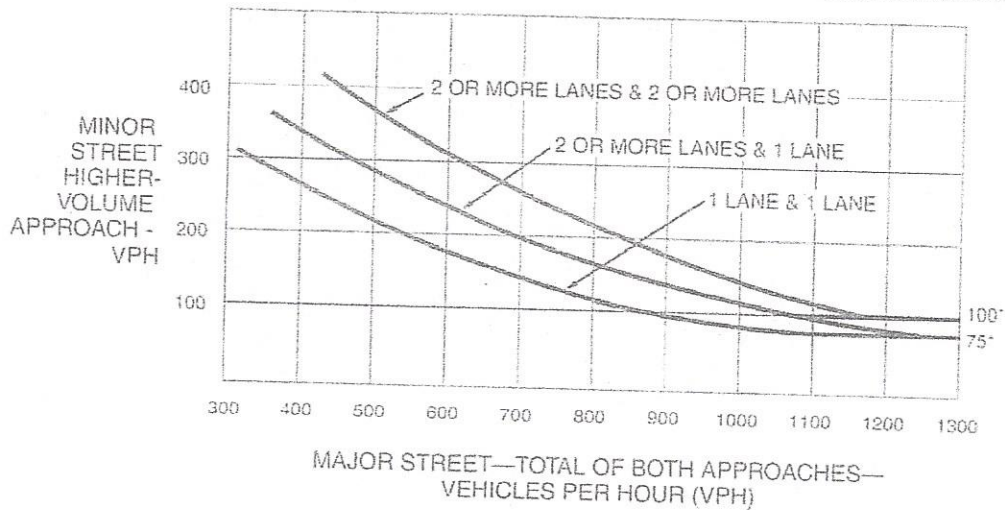
Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



\*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6:30 AM 3:30 PM 6:30 PM

- EXIST \*
- EPAP Δ
- EPAP CENTENNIAL +
- EPAP SR49 □
- CUMULATIVE ○
- CPP CENTENNIAL ●
- CPP SR49 X

- \* \*
- Δ Δ
- + +
- □
- ○
- ●
- X X

21. SUTTON/  
DORSEY

# TECHNICAL LOS APPENDIX VII

FOR

## IDAHO-MARYLAND MINE PROJECT TRAFFIC IMPACT ANALYSIS

Nevada County, CA

### TRAFFIC INDEX CALCULATIONS

*Prepared For:*

**Rise Grass Valley Inc.**

*Prepared By:*

**KD Anderson & Associates, Inc.**  
3853 Taylor Road, Suite G  
Loomis, CA 95650  
(916) 660-1555



April 8, 2021

*KD Anderson & Associates, Inc.*

Transportation Engineers



# **TRAFFIC INDEX CALCULATIONS**

NO PROJECT CONDITIONS

PLUS PROJECT CONDITIONS (CENTENNIAL SITE)

PLUS PROJECT CONDITIONS (TO SR 49)

**#3 Brunswick Rd Between Whispering Pines Ln to SR 20/49  
No Project Scenario**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	0	4,429	1,411	20	292	0	1	27	4			6,185
Northbound Percent	0.0%	71.6%	22.8%	0.3%	4.7%	0.0%	0.0%	0.4%	0.1%			100.0%
Southbound Volume	1	4,390	1,394	16	281	1	0	24	3			6,109
Southbound Percent	0.0%	71.9%	22.8%	0.3%	4.6%	0.0%	0.0%	0.4%	0.0%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	313	0	28	4	345
Southbound Volume	297	0	24	3	323

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	6,185	7,390	1.19
Southbound Volume	6,109	7,489	1.23

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	374	0	33	5	412
Southbound Volume	364	0	29	3	396

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	343	0	31	4	378
Southbound Volume	330	0	27	3	360

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	473,512	0	180,678	60,489	714,679	8.5
Southbound	455,641	0	157,059	40,897	653,597	8.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#103 Whispering Pines - Centennial to Crown Point  
No Project Scenario**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	8	1,170	353	3	59	11	1	2	2			1,608
Northbound Percent	0.5%	72.8%	22.0%	0.2%	3.6%	0.7%	0.0%	0.1%	0.1%			100.0%
Southbound Volume	8	1,322	335	5	46	21	3	1	4			1,744
Southbound Percent	0.4%	75.8%	19.2%	0.3%	2.6%	1.2%	0.2%	0.1%	0.2%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	61	11	2	2	77
Southbound Volume	51	11	4	4	70

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	1,608	2,352	1.46
Southbound Volume	1,744	2,443	1.40

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	90	17	3	2	112
Southbound Volume	71	16	5	6	98

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	76	14	3	2	94
Southbound Volume	61	14	4	5	84

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	104,221	51,355	16,894	28,280	200,750	7.5
Southbound	83,932	50,065	25,881	71,680	231,557	7.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#11 Whispering Pines - Brunswick to Crown Point  
No Project Scenario**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Eastbound Volume	9	903	322	6	78	12	0	3	5			1,339
Eastbound Percent	0.7%	67.5%	24.1%	0.4%	5.9%	0.9%	0.0%	0.2%	0.3%			100.0%
Westbound Volume	7	798	258	5	95	8	0	3	2			1,176
Westbound Percent	0.6%	67.8%	21.9%	0.4%	8.1%	0.7%	0.0%	0.3%	0.2%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	84	12	3	5	104
Westbound Volume	100	12	3	2	117

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Eastbound Volume	1,339	2,386	1.78
Westbound Volume	1,176	2,238	1.90

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	150	21	6	8	186
Westbound Volume	191	23	6	4	223

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	117	17	5	6	145
Westbound Volume	146	17	4	3	170

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Eastbound	161,880	61,425	27,263	89,448	340,016	8.0
Westbound	200,979	64,100	25,605	40,004	330,688	8.0

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#2 Brunswick Rd Between E. Bennett Rd and Whispering Pines Ln  
No Project Scenario**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	6	4,846	2,086	36	667	50	4	27	31			7,752
Northbound Percent	0.1%	62.5%	26.9%	0.5%	8.6%	0.6%	0.0%	0.3%	0.4%			100.0%
Southbound Volume	3	5,099	1,916	30	504	23	0	26	14			7,614
Southbound Percent	0.0%	67.0%	25.2%	0.4%	6.6%	0.3%	0.0%	0.3%	0.2%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	703	50	31	31	815
Southbound Volume	534	50	26	14	624

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	7,752	8,428	1.09
Southbound Volume	7,614	8,452	1.11

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	764	55	33	33	886
Southbound Volume	592	56	29	16	693

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	734	53	32	32	850
Southbound Volume	563	53	28	15	659

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	1,012,440	193,303	188,182	441,012	1,834,937	9.5
Southbound	776,988	195,420	163,361	203,536	1,339,305	9.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#9 Bennett - West of Brunswick Rd  
No Project Scenario**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Eastbound Volume	3	497	164	6	45	4	0	1	2			721
Eastbound Percent	0.5%	68.9%	22.7%	0.8%	6.2%	0.5%	0.0%	0.2%	0.2%			100.0%
Westbound Volume	2	531	169	7	50	3	0	1	0			763
Westbound Percent	0.2%	69.6%	22.1%	0.9%	6.6%	0.3%	0.0%	0.2%	0.0%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	50	4	1	2	57
Westbound Volume	57	4	1	0	62

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Eastbound Volume	722	978	1.35
Westbound Volume	764	1,136	1.49

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	68	5	2	2	77
Westbound Volume	85	5	2	0	93

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	59	4	2	2	67
Westbound Volume	71	5	2	0	78

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Eastbound	81,774	15,886	9,230	27,038	133,928	7.0
Westbound	97,810	16,778	9,749	5,712	130,049	7.0

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#1 Brunswick Rd Between the Project Site Access and E. Bennett Rd  
No Project Scenario**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	35	3,221	1,072	19	300	13	0	12	7			4,680
Northbound Percent	0.8%	68.8%	22.9%	0.4%	6.4%	0.3%	0.0%	0.3%	0.2%			100.0%
Southbound Volume	29	3,431	1,086	14	155	15	0	7	14			4,752
Southbound Percent	0.6%	72.2%	22.9%	0.3%	3.3%	0.3%	0.0%	0.1%	0.3%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	319	13	12	7	352
Southbound Volume	170	13	7	14	204

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	4,684	5,079	1.08
Southbound Volume	4,752	5,197	1.09

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	346	14	13	8	382
Southbound Volume	186	14	8	15	223

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	333	14	13	8	367
Southbound Volume	178	14	8	15	214

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	459,261	49,857	75,578	105,314	690,010	8.5
Southbound	245,103	50,080	45,139	201,953	542,275	8.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.





**#102 Brunswick Rd Between Whispering Pines Ln to SR 20/49  
Plus Project Scenario (Centennial Site)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	0	4,429	1,411	20	292	0	1	27	4			6,185
Northbound Percent	0.0%	71.6%	22.8%	0.3%	4.7%	0.0%	0.0%	0.4%	0.1%			100.0%
Southbound Volume	1	4,390	1,394	16	281	1	0	24	3			6,109
Southbound Percent	0.0%	71.9%	22.8%	0.3%	4.6%	0.0%	0.0%	0.4%	0.0%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	313	0	28	4	345
Southbound Volume	297	0	24	3	323

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	6,185	7,393	1.20
Southbound Volume	6,109	7,492	1.23

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	374	3	36	7	420
Southbound Volume	364	3	32	5	405

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	343	2	32	5	382
Southbound Volume	330	2	28	4	364

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	473,616	5,520	189,538	74,283	742,957	8.5
Southbound	455,741	5,520	165,914	54,686	681,862	8.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#103 Whispering Pines - Centennial to Crown Point  
Plus Project Scenario (Centennial)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Eastbound Volume	8	1,170	353	3	59	11	1	2	2			1,608
Eastbound Percent	0.5%	72.8%	22.0%	0.2%	3.6%	0.7%	0.0%	0.1%	0.1%			100.0%
Westbound Volume	8	1,322	335	5	46	21	3	1	4			1,744
Westbound Percent	0.4%	75.8%	19.2%	0.3%	2.6%	1.2%	0.2%	0.1%	0.2%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	61	11	2	2	77
Westbound Volume	51	11	4	4	70

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Eastbound Volume	1,608	2,366	1.47
Westbound Volume	1,744	2,457	1.41

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	90	17	17	2	127
Westbound Volume	71	16	19	6	113

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	76	14	10	2	102
Westbound Volume	61	14	11	5	91

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Eastbound	104,589	51,537	58,114	28,380	242,620	7.5
Westbound	84,213	50,232	67,127	71,920	273,492	7.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#104 Whispering Pines - Brunswick to Crown Point  
Plus Project Scenario (Centennial)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Eastbound Volume	9	903	322	6	78	12	0	3	5			1,339
Eastbound Percent	0.7%	67.5%	24.1%	0.4%	5.9%	0.9%	0.0%	0.2%	0.3%			100.0%
Westbound Volume	7	798	258	5	95	8	0	3	2			1,176
Westbound Percent	0.6%	67.8%	21.9%	0.4%	8.1%	0.7%	0.0%	0.3%	0.2%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	84	12	3	5	104
Westbound Volume	100	12	3	2	117

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Eastbound Volume	1,339	2,400	1.79
Westbound Volume	1,176	2,252	1.91

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	151	22	20	8	201
Westbound Volume	192	23	20	4	239

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	118	17	12	7	153
Westbound Volume	146	17	11	3	178

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Eastbound	162,489	61,656	68,525	89,784	382,454	8.0
Westbound	201,803	64,362	66,870	40,168	373,204	8.0

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#105 Brunswick Rd Between E. Bennett Rd and Whispering Pines Ln  
Plus Project Scenario (Centennial)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	6	4,846	2,086	36	667	50	4	27	31			7,752
Northbound Percent	0.1%	62.5%	26.9%	0.5%	8.6%	0.6%	0.0%	0.3%	0.4%			100.0%
Southbound Volume	3	5,099	1,916	30	504	23	0	26	14			7,614
Southbound Percent	0.0%	67.0%	25.2%	0.4%	6.6%	0.3%	0.0%	0.3%	0.2%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	703	50	31	31	815
Southbound Volume	534	50	26	14	624

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	7,752	8,480	1.09
Southbound Volume	7,614	8,504	1.12

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	769	58	86	36	948
Southbound Volume	596	59	81	18	754

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	736	54	58	33	881
Southbound Volume	565	55	54	16	689

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	1,015,694	199,444	341,667	456,209	2,013,014	10.0
Southbound	779,502	201,572	316,770	217,975	1,515,819	9.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#106 Bennett - West of Brunswick Rd  
Plus Project Scenario (Centennial)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Eastbound Volume	3	497	164	6	45	4	0	1	2			721
Eastbound Percent	0.5%	68.9%	22.7%	0.8%	6.2%	0.5%	0.0%	0.2%	0.2%			100.0%
Westbound Volume	2	531	169	7	50	3	0	1	0			763
Westbound Percent	0.2%	69.6%	22.1%	0.9%	6.6%	0.3%	0.0%	0.2%	0.0%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	50	4	1	2	57
Westbound Volume	57	4	1	0	62

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Eastbound Volume	722	1,030	1.43
Westbound Volume	764	1,136	1.49

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	72	8	54	4	138
Westbound Volume	85	5	2	0	93

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Eastbound Volume	61	6	28	3	98
Westbound Volume	71	5	2	0	78

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Eastbound	84,276	21,891	162,392	41,645	310,205	8.0
Westbound	97,810	16,778	9,749	5,712	130,049	7.0

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#107 Brunswick Rd Between the Project Site Access and E. Bennett Rd  
Plus Project Scenario (Centennial)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	35	3,221	1,072	19	300	13	0	12	7			4,680
Northbound Percent	0.8%	68.8%	22.9%	0.4%	6.4%	0.3%	0.0%	0.3%	0.2%			100.0%
Southbound Volume	29	3,431	1,086	14	155	15	0	7	14			4,752
Southbound Percent	0.6%	72.2%	22.9%	0.3%	3.3%	0.3%	0.0%	0.1%	0.3%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	319	13	12	7	352
Southbound Volume	170	13	7	14	204

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	4,684	5,079	1.08
Southbound Volume	4,752	5,249	1.10

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	346	14	13	8	382
Southbound Volume	187	17	60	17	282

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	333	14	13	8	367
Southbound Volume	179	15	34	16	243

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	459,261	49,857	75,578	105,314	690,010	8.5
Southbound	246,384	55,862	198,255	216,789	717,289	8.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.



**#102 Brunswick Rd Between Whispering Pines Ln to SR 20/49  
Plus Project Scenario (To SR 49)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	0	4,429	1,411	20	292	0	1	27	4			6,185
Northbound Percent	0.0%	71.6%	22.8%	0.3%	4.7%	0.0%	0.0%	0.4%	0.1%			100.0%
Southbound Volume	1	4,390	1,394	16	281	1	0	24	3			6,109
Southbound Percent	0.0%	71.9%	22.8%	0.3%	4.6%	0.0%	0.0%	0.4%	0.0%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	313	0	28	4	345
Southbound Volume	297	0	24	3	323

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	6,185	7,429	1.20
Southbound Volume	6,109	7,528	1.23

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	376	3	73	7	458
Southbound Volume	366	3	69	5	442

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	344	2	50	5	401
Southbound Volume	331	2	46	4	383

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	474,872	5,520	295,857	74,443	850,693	9.0
Southbound	456,948	5,520	272,170	54,794	789,432	8.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.



**#105 Brunswick Rd Between E. Bennett Rd and Whispering Pines Ln  
Plus Project Scenario (To SR 49)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	6	4,846	2,086	36	667	50	4	27	31			7,752
Northbound Percent	0.1%	62.5%	26.9%	0.5%	8.6%	0.6%	0.0%	0.3%	0.4%			100.0%
Southbound Volume	3	5,099	1,916	30	504	23	0	26	14			7,614
Southbound Percent	0.0%	67.0%	25.2%	0.4%	6.6%	0.3%	0.0%	0.3%	0.2%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	703	50	31	31	815
Southbound Volume	534	50	26	14	624

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	7,752	8,480	1.09
Southbound Volume	7,614	8,504	1.12

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	769	58	86	36	948
Southbound Volume	596	59	81	18	754

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	736	54	58	33	881
Southbound Volume	565	55	54	16	689

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	1,015,694	199,444	341,667	456,209	2,013,014	10.0
Southbound	779,502	201,572	316,770	217,975	1,515,819	9.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#106 Bennett - West of Brunswick Rd  
Plus Project Scenario (To SR 49)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	3	497	164	6	45	4	0	1	2			721
Northbound Percent	0.5%	68.9%	22.7%	0.8%	6.2%	0.5%	0.0%	0.2%	0.2%			100.0%
Southbound Volume	2	531	169	7	50	3	0	1	0			763
Southbound Percent	0.2%	69.6%	22.1%	0.9%	6.6%	0.3%	0.0%	0.2%	0.0%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	50	4	1	2	57
Southbound Volume	57	4	1	0	62

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	722	1,030	1.43
Southbound Volume	764	1,136	1.49

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	72	8	54	4	138
Southbound Volume	85	5	2	0	93

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	61	6	28	3	98
Southbound Volume	71	5	2	0	78

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	84,276	21,891	162,392	41,645	310,205	8.0
Southbound	97,810	16,778	9,749	5,712	130,049	7.0

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

**#107 Brunswick Rd Between the Project Site Access and E. Bennett Rd  
Plus Project Scenario (To SR 49)**

Count Data by FHWA Vehicle Classification Number												
	1	2	3	4	5	6	7	8	9	10	11	Total
Northbound Volume	35	3,221	1,072	19	300	13	0	12	7			4,680
Northbound Percent	0.8%	68.8%	22.9%	0.4%	6.4%	0.3%	0.0%	0.3%	0.2%			100.0%
Southbound Volume	29	3,431	1,086	14	155	15	0	7	14			4,752
Southbound Percent	0.6%	72.2%	22.9%	0.3%	3.3%	0.3%	0.0%	0.1%	0.3%			100.0%

Existing Count Data by Caltrans Highway Design Manual ESAL Vehicle Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	319	13	12	7	352
Southbound Volume	170	13	7	14	204

Travel Forecasting Volumes			
	Base Year	Future Year	Growth Factor
Northbound Volume	4,684	5,079	1.08
Southbound Volume	4,752	5,249	1.10

Future Volumes by					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	346	14	13	8	382
Southbound Volume	187	17	60	17	282

Average of Existing and Future Volumes by Caltrans HDM ESAL Classifications					
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Total
Northbound Volume	333	14	13	8	367
Southbound Volume	179	15	34	16	243

Calculation of 20-Year ESAL and Traffic Index						
	2-Axle Trucks or Buses	3-Axle Trucks or Buses	4-Axle Trucks	5 or More -Axle Trucks	Sum of ESAL	Traffic Index (TI)
ESAL Constant	1380	3680	5880	13780		
Northbound	459,261	49,857	75,578	105,314	690,010	8.5
Southbound	246,384	55,862	198,255	216,789	717,289	8.5

Note: Total may not equal sum of components due to rounding.  
Methodology per California Department of Transportation 2018.

# TECHNICAL LOS APPENDIX VIII

FOR

## IDAHO-MARYLAND MINE PROJECT TRAFFIC IMPACT ANALYSIS

Nevada County, CA

### PROJECT TRIP CALCULATIONS

*Prepared For:*

**Rise Grass Valley Inc.**

*Prepared By:*

**KD Anderson & Associates, Inc.**  
3853 Taylor Road, Suite G  
Loomis, CA 95650  
(916) 660-1555



April 8, 2021

*KD Anderson & Associates, Inc.*

Transportation Engineers

# PROJECT TRIP CALCULATIONS

## PROJECT TRIP GENERATION

EMPLOYEE TRAFFIC			
<b>Employee Trips (Full Mine Production)</b>			
<b>Brunswick Site</b>	<b>Incoming</b>	<b>Outgoing</b>	
7 AM shiftchange - Monday -Friday	107	67	312 Total Employees
7 AM shiftchange - Saturday- Sunday	67	67	107 Maximum Employees onsite
3:30 PM shift change - Monday - Friday		40	
7 PM shiftchange - Monday- Sunday	67	67	
<b>Centennial Site</b>	<b>Incoming</b>	<b>Outgoing</b>	
7 AM shiftchange - Monday -Friday	4		
3:30 PM shift change - Monday - Friday		4	
HAUL TRAFFIC			
<b>Engineered Fill Trucking - Brunswick to Centennial</b>		<b>Truck Type:</b>	Aggregate dump truck with capacity of 20 tons.
Average daily trucking	1000 tons		Typical: Standard Duty SuperTag
Maximum daily trucking	2000 tons		
Truck payload	20 tons	<b>Hauling Schedule:</b>	24 hs per day, 7 days per week
Average daily trucking	50.0 trips per day	<b>Duration:</b>	Approx. 5 - 6 yrs
Maximum daily trucking	100.0 trips per day		
<b>Concentrate Trucking - Brunswick to west coast port or Nevada State</b>		<b>Truck Type:</b>	Semi-truck with flat bed trailer. Capacity required: 20 tons.
Average daily trucking	20 tons		Concentrate is packaged in 2-ton bags.
Maximum daily trucking	100 tons		
Truck payload	20 tons	<b>Hauling Schedule:</b>	Flexible.
Average daily trucking	1.0 trips per day		Plan for 7 days per week outside rush hour times.
Maximum daily trucking	5.0 trips per day		
MATERIALS & SUPPLIES TRAFFIC			
<b>Materials &amp; Supplys - Brunswick</b>		* Anticipated to occur during typical business hours, weekdays.	
	<b>Average per week</b>	<b>Maximum per Day</b>	
Fuel Trucks	11.2	2	12,000 gallons per day consumption = 84,000 gallons per week = ~11.2 fuel trucks per week
Explosives Trucks	0.3	1	
Cement Delivery	8.8	2	Assume 5% cement content average = 9,125 tons per year = 175 tons per week = 8.75 trucks per week
Freight Trucks	2.7	3	
Outside Services (light vehicles)	21.0	4	Outside services includes vendors, deliveries, and other ancillary vehicle traffic to support operations.
<b>Total</b>	<b>44.0</b>	<b>12</b>	
<b>Materials &amp; Supplys - Centennial</b>			
	<b>Average per week</b>	<b>Maximum per Day</b>	
Fuel Trucks	1.5	1	1200 gallons per day consumption = 8400 gallons per week = ~1.5 fuel trucks per week

# TECHNICAL LOS APPENDIX IX

FOR

## IDAHO-MARYLAND MINE PROJECT TRAFFIC IMPACT ANALYSIS

Nevada County, CA

### FAIR SHARE PERCENTAGES & COST

*Prepared For:*

**Rise Grass Valley Inc.**

*Prepared By:*

**KD Anderson & Associates, Inc.**  
3853 Taylor Road, Suite G  
Loomis, CA 95650  
(916) 660-1555



April 8, 2021

*KD Anderson & Associates, Inc.*

Transportation Engineers

## FAIR SHARE PERCENTAGES & COST



## FAIR SHARE PERCENTAGES & COSTS

$$\frac{\text{Project Volumes}}{(\text{Future} + \text{Project}) - \text{EPAP (existing \& approved projects)}}$$

### #11 Brunswick Rd / Sutton Way

	Scenario #1 (Centennial Site)		Scenario #2 (SR 49)
	<u>13</u>		<u>29</u>
3:30 – 4:30 PM	3,425 – 3,100	3:30 – 4:30 PM	3,441 – 3,100
<b>Fair Share Percentage:</b>	<b>4.0%</b>		<b>8.5%</b>
Estimated Cost for Retiming: \$5,000			
<b>Fair Share Amount:</b>	<b>\$200</b>		<b>\$425</b>

### #12 Brunswick Rd / Idaho-Maryland Rd

	Scenario #1 (Centennial Site)		Scenario #2 (SR 49)
	<u>35</u>		<u>51</u>
3:30 – 4:30 PM	1,894 – 1,497	3:30 – 4:30 PM	1,906 – 1,497
<b>Fair Share Percentage:</b>	<b>8.8%</b>		<b>12.5%</b>
Estimated Cost: \$321,380 (GVTIF ‘Other Funds’)			
<b>Fair Share Amount:</b>	<b>\$28,282</b>		<b>\$40,173</b>

**FAIR SHARE PERCENTAGES & COSTS (Cont.)**

**#15 Brunswick Rd / SR 174**

	<b>Scenario #1 (Centennial Site)</b>		<b>Scenario #2 (SR 49)</b>
	<u>10</u>		<u>10</u>
3:30 – 4:30 PM	1,250 – 1,183	3:30 – 4:30 PM	1,250 – 1,183
<b>Fair Share Percentage:</b>	<b>14.9%</b>		<b>14.9%</b>
Estimated Cost: \$450,000 (Conceptual Layout)			
<b>Fair Share Amount:</b>	<b>\$67,050</b>		<b>\$67,050</b>

**#19 Idaho-Maryland Rd / Centennial Drive**

	<b>Scenario #1 (Centennial Site)</b>		<b>Scenario #2 (SR 49)</b>
	<u>18</u>		<u>18</u>
3:30 – 4:30 PM	1,237 – 1,098	3:30 – 4:30 PM	1,237 – 1,098
<b>Fair Share Percentage:</b>	<b>12.9%</b>		<b>12.9%</b>
Estimated Cost: \$638,827 (GVTIF ‘Other Funds’)			
<b>Fair Share Amount:</b>	<b>\$82,409</b>		<b>\$82,409</b>

**#21 Sutton Way / Dorsey Drive**

	<b>Scenario #1 (Centennial Site)</b>		<b>Scenario #2 (SR 49)</b>
	<u>2</u>		<u>2</u>
3:30 – 4:30 PM	1,936 – 985	3:30 – 4:30 PM	1,936 – 985
<b>Fair Share Percentage:</b>	<b>0.2%</b>		<b>0.2%</b>

Estimated Cost: Unknown per City of Grass Valley

# TECHNICAL LOS APPENDIX X

FOR

## IDAHO-MARYLAND MINE PROJECT TRAFFIC IMPACT ANALYSIS

Nevada County, CA

### FEHR & PEERS VMT ANALYSIS MEMO

*Prepared For:*

**Rise Grass Valley Inc.**

*Prepared By:*

**KD Anderson & Associates, Inc.**  
3853 Taylor Road, Suite G  
Loomis, CA 95650  
(916) 660-1555



April 8, 2021

*KD Anderson & Associates, Inc.*

Transportation Engineers

FEHR & PEERS VMT ANALYSIS  
3-17-20 MEMO

*KDA*

## MEMORANDUM

Date: March 17, 2020  
To: Jonathan Flecker – KD Anderson & Associates  
From: Kwasi Donkor – Fehr & Peers DC  
**Subject: Rise Grass Valley Vehicle Miles Traveled Analysis**

*DC20-0062*

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This memorandum outlines the vehicles miles traveled (VMT) analysis methodology and results for the Rise Grass Valley project in Nevada County, California. This analysis was prepared for KD Anderson & Associates as part of their ongoing work on the Rise Grass Valley project.

### Analysis Scenarios

This VMT analysis includes four scenarios, described as follows.

- Base Year – VMT is analyzed under the 2012 model base year condition, assuming no activity at the Brunswick or Centennial Industrial sites.
- Base Year Plus Project – VMT is analyzed under plus project conditions, assuming operations at the Brunswick site. For the purposes of the modeling, the Centennial Industrial site employees were added to the Brunswick site.
- Cumulative Year – VMT is analyzed under the 2035 future year condition, assuming no activity at the Brunswick or Centennial Industrial sites.
- Cumulative Year Plus Project – VMT is analyzed under future 2035 plus project conditions, assuming operations at the Brunswick site. As with the base year scenario, the Centennial Industrial site employees were added to the Brunswick site.



## Methodology

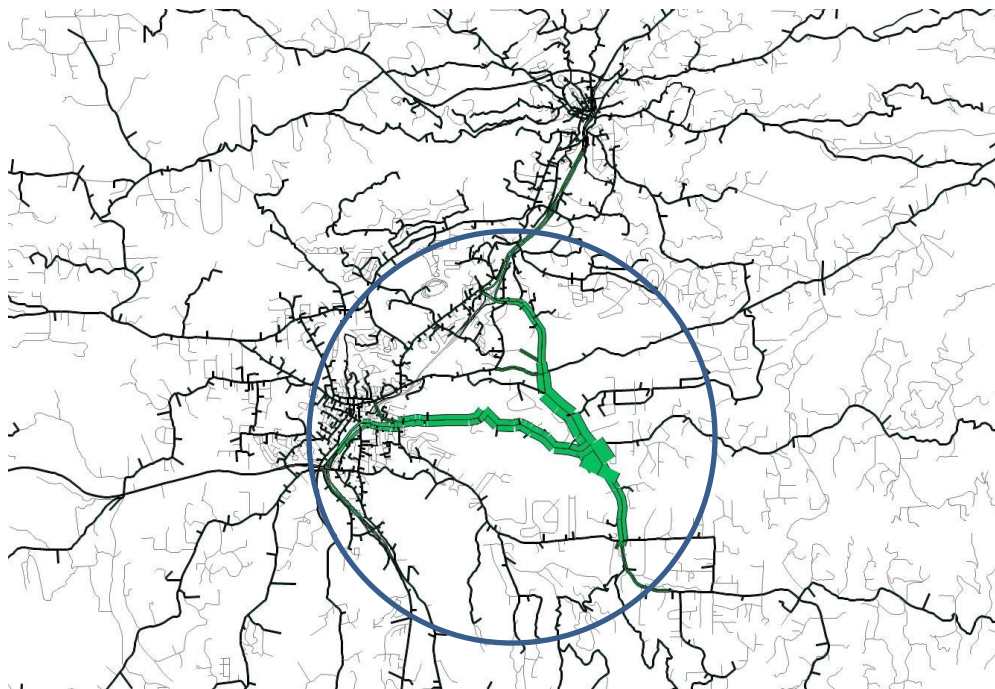
For the purposes of analyzing this mining land use project, vehicle miles traveled (VMT) was calculated by the following general equation:

$$VMT = (\text{Avg. trip length} \times \text{Vehicle trips})_{\text{Employees}}$$

VMT estimates for heavy-duty trucks were not included in the analysis.

We used the current version of the NCTC Travel Demand Model to calculate VMT for the analysis scenarios. For the plus project scenarios, we added the project's proposed land use to a representative traffic analysis zone (TAZ) of the project location in the travel model.

To calculate the VMT generated by the project, we performed a select zone analysis of the project TAZ to track the project trips throughout the model network. To understand the project's VMT effect as noted in the NCTC SB 743 VMT Implementation document, we reviewed the travel model's distribution of project trips on the model network and developed a project influence area to compare daily VMT for the no project and plus project scenarios. This VMT was calculated by multiplying the number of vehicle trips on roadways within that influence area by the distances of the roadway segments captured. The figure below shows the influence area of the project.





## Results

Table 1 shows the daily VMT summary for the project. Table 2 shows a summary of the VMT effect of the project.

<b>TABLE 1: RISE GRASS VALLEY PROJECT GENERATED VMT SUMMARY</b>		
<b>Metric</b>	<b>2012 Base Year</b>	<b>2035 Future Year</b>
Total Daily Project VMT	1,637	1,538
Maximum Employees on Site (Including Centennial employees)	111	111
Daily VMT per Employee	14.7	13.9
Notes: VMT = vehicle miles traveled Source: <i>Fehr &amp; Peers, 2020</i>		

<b>TABLE 2: RISE GRASS VALLEY PROJECT VMT EFFECT SUMMARY</b>		
<b>Scenario</b>	<b>2012 Base Year</b>	<b>2035 Future Year</b>
No Project	438,990	513,575
Plus Project	439,435	513,991
Growth	445	416
Notes: VMT = vehicle miles traveled Source: <i>Fehr &amp; Peers, 2020</i>		