Idaho-Maryland Mine Project

SCH# 2020070378

Final Environmental Impact Report

Volume IX of IX
(Appendix N *Continued* – Appendix R)

Prepared for
County of Nevada

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Appendix N *(CONTINUED)*

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	
Conflicting Flow All	0	0	78	0	178	78
Stage 1	-	-	-	-	78	-
Stage 2	-	-	-	-	100	-
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	-	-	1520	-	812	983
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	924	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1520	-	807	983
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	-



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	1722	1752	1870	1796	1870	1767
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, %	12	10	2	7	2	9
Cap, veh/h	455	392	9	790	298	76
Arrive On Green	0.26	0.26	0.00	0.44	0.22	0.22
Sat Flow, veh/h	1722	1485	1781	1796	1365	348
Grp Volume(v), veh/h	142	45	3	126	65	0
Grp Sat Flow(s),veh/h/ln	1722	1485	1781	1796	1739	0
Q Serve(g_s), s	1.8	0.6	0.0	1.2	0.8	0.0
Cycle Q Clear(g_c), s	1.8	0.6	0.0	1.2	0.8	0.0
Prop In Lane		1.00	1.00		0.78	0.20
Lane Grp Cap(c), veh/h	455	392	9	790	379	0
V/C Ratio(X)	0.31	0.11	0.34	0.16	0.17	0.00
Avail Cap(c_a), veh/h	1897	1636	473	1652	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	0.4	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	8.5	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	8.3			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	3.8	3.2
Green Ext Time (p_c), s	0.1	0.0	0.9	0.6

Intersection Summary	
HCM 6th Ctrl Delay	7.5
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	8.1
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	8	3	2	2	4
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	7.7	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	0.099
Departure Headway (Hd)	4.439	4.183	5.585	4.414
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	811	859	643	814
Service Time	2.449	2.195	3.3	2.129
HCM Lane V/C Ratio	0.194	0.101	0.067	0.098
HCM Control Delay	8.5	7.7	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



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	1781	1767	1826	1767	1767
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	8	9	5	9	9
Cap, veh/h	134	279	483	423	181	982
Arrive On Green	0.08	0.08	0.27	0.27	0.11	0.56
Sat Flow, veh/h	1739	1510	1767	1547	1682	1767
Grp Volume(v), veh/h	47	27	291	26	122	465
Grp Sat Flow(s),veh/h/ln	1739	1510	1767	1547	1682	1767
Q Serve(g_s), s	0.7	0.4	4.2	0.4	2.0	4.6
Cycle Q Clear(g_c), s	0.7	0.4	4.2	0.4	2.0	4.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	134	279	483	423	181	982
V/C Ratio(X)	0.35	0.10	0.60	0.06	0.67	0.47
Avail Cap(c_a), veh/h	840	892	1828	1601	1147	2979
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	1.2	0.1	4.3	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	0.3	0.1	1.0	0.1	0.7	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.3	10.0	10.4	7.9	16.8	4.3
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	74		317			587
Approach Delay, s/veh	12.7		10.2			6.9
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	4.6	6.2			6.6	2.7
Green Ext Time (p_c), s	0.2	1.6			2.9	0.1

Intersection Summary	
HCM 6th Ctrl Delay	8.4
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	1.6	2.1	1.1
Total Del/Veh (s)	16.4	7.2	10.7	11.0	9.6

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	2.9	0.7
Total Del/Veh (s)	8.5	13.5	14.2	35.6	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)	4.6	4.6	23.5	9.0

11: Sutton Way & Brunswick Rd Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.6	1.5	0.0	0.5
Total Del/Veh (s)	9.6	16.2	14.4	3.7	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

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)	6.7	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 Flows Total veh/h	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	0.107	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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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



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	1856	1870	1826	1441	1737	1693
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, %	3	2	5	31	11	14
Cap, veh/h	412	52	77	563	547	804
Arrive On Green	0.26	0.26	0.23	0.23	0.33	0.33
Sat Flow, veh/h	1615	204	335	2529	1654	1434
Grp Volume(v), veh/h	0	401	263	230	274	587
Grp Sat Flow(s),veh/h/ln	0	1819	1424	1369	1654	1434
Q Serve(g_s), s	0.0	16.1	13.4	11.9	10.1	23.3
Cycle Q Clear(g_c), s	0.0	16.1	13.4	11.9	10.1	23.3
Prop In Lane		0.11	0.24		1.00	1.00
Lane Grp Cap(c), veh/h	0	464	326	314	547	804
V/C Ratio(X)	0.00	0.86	0.81	0.73	0.50	0.73
Avail Cap(c_a), veh/h	0	602	471	453	548	804
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	27.2	27.8	27.3	20.5	12.5
Incr Delay (d2), s/veh	0.0	10.0	6.6	3.5	0.7	3.4
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	7.9	5.0	4.0	3.8	11.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	37.2	34.4	30.7	21.2	15.9
LnGrp LOS	A	D	C	C	C	B
Approach Vol, veh/h	401			493	861	
Approach Delay, s/veh	37.2			32.7	17.6	
Approach LOS	D			C	B	

Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		30.0		24.2		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		25.3		18.1		15.4
Green Ext Time (p_c), s		0.0		1.4		2.2

Intersection Summary		
HCM 6th Ctrl Delay		26.3
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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	1693	1826	1870	1544	1826	1856
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, %	14	5	2	24	5	3
Cap, veh/h	1090	209	40	638	118	43
Arrive On Green	0.40	0.40	0.23	0.23	0.10	0.10
Sat Flow, veh/h	2777	516	176	2904	1225	445
Grp Volume(v), veh/h	455	453	236	204	121	0
Grp Sat Flow(s),veh/h/ln	1608	1600	1536	1467	1684	0
Q Serve(g_s), s	12.0	12.0	7.2	6.4	3.6	0.0
Cycle Q Clear(g_c), s	12.0	12.0	7.2	6.4	3.6	0.0
Prop In Lane		0.32	0.11		0.73	0.26
Lane Grp Cap(c), veh/h	651	648	346	331	162	0
V/C Ratio(X)	0.70	0.70	0.68	0.62	0.75	0.00
Avail Cap(c_a), veh/h	1265	1259	758	725	342	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	12.6	12.7	18.1	17.8	22.5	0.0
Incr Delay (d2), s/veh	1.4	1.4	2.3	1.9	6.7	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	3.8	3.8	2.5	2.1	1.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.0	14.0	20.5	19.7	29.2	0.0
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	908			440	121	
Approach Delay, s/veh	14.0			20.1	29.2	
Approach LOS	B			C	C	

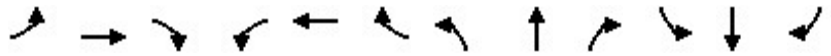
Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	9.5	25.4	16.3
Change Period (Y+Rc), s	4.6	* 4.7	4.7
Max Green Setting (Gmax), s	10.4	* 40	25.3
Max Q Clear Time (g_c+I1), s	5.6	14.0	9.2
Green Ext Time (p_c), s	0.1	6.7	2.4

Intersection Summary	
HCM 6th Ctrl Delay	17.1
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	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	0.90
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1781	1870	1870	1870	1722	1648	1870	1870	1693	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	8	2	2	2	12	17	2	2	14	2
Cap, veh/h	0	250	495	141	135	240	319	586	23	77	669	19
Arrive On Green	0.00	0.13	0.13	0.15	0.15	0.15	0.19	0.37	0.37	0.04	0.22	0.22
Sat Flow, veh/h	0	1870	1510	934	890	1585	1640	1575	62	1781	3029	87
Grp Volume(v), veh/h	0	10	207	207	0	184	279	0	557	48	259	244
Grp Sat Flow(s),veh/h/ln	0	1870	1510	1824	0	1585	1640	0	1637	1781	1608	1508
Q Serve(g_s), s	0.0	0.3	7.5	7.6	0.0	7.8	11.6	0.0	22.7	1.9	10.5	10.5
Cycle Q Clear(g_c), s	0.0	0.3	7.5	7.6	0.0	7.8	11.6	0.0	22.7	1.9	10.5	10.5
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	250	495	276	0	240	319	0	609	77	355	333
V/C Ratio(X)	0.00	0.04	0.42	0.75	0.00	0.77	0.87	0.00	0.91	0.62	0.73	0.73
Avail Cap(c_a), veh/h	0	264	507	387	0	337	348	0	684	175	557	522
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	26.5	18.3	28.5	0.0	28.6	27.4	0.0	21.0	33.0	25.4	25.4
Incr Delay (d2), s/veh	0.0	0.1	0.6	5.0	0.0	6.7	20.0	0.0	15.9	7.9	2.9	3.1
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	2.5	3.5	0.0	3.2	5.8	0.0	10.0	0.9	3.9	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	26.5	18.9	33.5	0.0	35.2	47.4	0.0	36.8	40.9	28.3	28.5
LnGrp LOS	A	C	B	C	A	D	D	A	D	D	C	C
Approach Vol, veh/h		217			391			836			551	
Approach Delay, s/veh		19.3			34.3			40.4			29.5	
Approach LOS		B			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.1	31.8		14.5	18.7	21.2		15.7
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1
Max Green Setting (Gmax), s	6.9	29.3		9.9	14.9	24.3		14.9
Max Q Clear Time (g_c+I1), s	13.9	24.7		9.5	13.6	12.5		9.8
Green Ext Time (p_c), s	0.0	1.4		0.0	0.1	2.1		0.8

Intersection Summary	
HCM 6th Ctrl Delay	33.9
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	3	4	9	9	4
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	6.945	4.16	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3285	2.238	-	-	-
Pot Cap-1 Maneuver	86	597	809	-	-	-
Stage 1	457	-	-	-	-	-
Stage 2	336	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	74	597	809	-	-	-
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)	809	-	252	597	-	-
HCM Lane V/C Ratio	0.141	-	0.142	0.086	-	-
HCM Control Delay (s)	10.2	-	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	59.6
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, %	3	2	2	2	2	4	2	9	2	3	9	3
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	13.8	17.3	109.2	21.2
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	1.156	0.24	0.509	0.115	0.654
Departure Headway (Hd)	7.17	6.765	8.19	7.13	7.779	7.303
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	496	535	441	508	464	498
Service Time	4.96	4.555	6.19	5.13	5.479	5.003
HCM Lane V/C Ratio	0.058	1.15	0.256	0.537	0.121	0.681
HCM Control Delay	10.4	113.9	13.8	17.3	11.5	22.8
HCM Lane LOS	B	F	B	C	B	C
HCM 95th-tile Q	0.2	21.1	0.9	2.8	0.4	4.7

Intersection	
Int Delay, s/veh	7.4

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, %	3	13	10	5	3	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	4.13	-	-	-	6.43	6.22
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.318
Pot Cap-1 Maneuver	1263	-	-	0	393	746
Stage 1	-	-	-	0	755	-
Stage 2	-	-	-	0	656	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	1263	-	-	-	352	746
Mov Cap-2 Maneuver	-	-	-	-	352	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	656	-

Approach	EB	WB	SB
HCM Control Delay, s	3.7	0	18.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2
Capacity (veh/h)	1263	-	-	352	746
HCM Lane V/C Ratio	0.105	-	-	0.478	0.155
HCM Control Delay (s)	8.2	-	-	24.2	10.7
HCM Lane LOS	A	-	-	C	B
HCM 95th %tile Q(veh)	0.4	-	-	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	9	9	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, %	3	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	-



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	1841	1781	1870	1781	1826	1870
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, %	4	8	2	8	5	2
Cap, veh/h	666	546	65	1001	163	24
Arrive On Green	0.36	0.36	0.04	0.56	0.11	0.11
Sat Flow, veh/h	1841	1510	1781	1781	1476	219
Grp Volume(v), veh/h	249	354	24	258	94	0
Grp Sat Flow(s),veh/h/ln	1841	1510	1781	1781	1713	0
Q Serve(g_s), s	2.9	5.6	0.4	2.1	1.5	0.0
Cycle Q Clear(g_c), s	2.9	5.6	0.4	2.1	1.5	0.0
Prop In Lane		1.00	1.00		0.86	0.13
Lane Grp Cap(c), veh/h	666	546	65	1001	189	0
V/C Ratio(X)	0.37	0.65	0.37	0.26	0.50	0.00
Avail Cap(c_a), veh/h	1944	1595	453	1571	913	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	13.5	3.2	12.0	0.0
Incr Delay (d2), s/veh	0.3	1.3	3.5	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	0.7	1.2	0.2	0.2	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.1	8.9	17.0	3.4	14.0	0.0
LnGrp LOS	A	A	B	A	B	A
Approach Vol, veh/h	603			282	94	
Approach Delay, s/veh	8.2			4.5	14.0	
Approach LOS	A			A	B	

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	7.9	5.7	15.1	20.8
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	3.5	2.4	7.6	4.1
Green Ext Time (p_c), s	0.2	0.0	2.8	1.4

Intersection Summary	
HCM 6th Ctrl Delay	7.7
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	10.4
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, %	3	3	7	2	2	3
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	10.7	9.4
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)	0.362	0.404	0.096	0.189
Departure Headway (Hd)	4.894	4.548	6.363	5.167
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	730	786	559	688
Service Time	2.953	2.601	4.144	2.947
HCM Lane V/C Ratio	0.364	0.407	0.097	0.192
HCM Control Delay	10.7	10.7	9.8	9.2
HCM Lane LOS	B	B	A	A
HCM 95th-tile Q	1.7	2	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



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	1796	1767	1826	1767	1767
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	7	9	5	9	9
Cap, veh/h	239	542	744	651	368	1257
Arrive On Green	0.14	0.14	0.42	0.42	0.22	0.71
Sat Flow, veh/h	1739	1522	1767	1547	1682	1767
Grp Volume(v), veh/h	64	212	707	161	322	341
Grp Sat Flow(s),veh/h/ln	1739	1522	1767	1547	1682	1767
Q Serve(g_s), s	2.3	7.4	27.4	4.8	13.1	4.9
Cycle Q Clear(g_c), s	2.3	7.4	27.4	4.8	13.1	4.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	239	542	744	651	368	1257
V/C Ratio(X)	0.27	0.39	0.95	0.25	0.87	0.27
Avail Cap(c_a), veh/h	346	636	753	660	473	1257
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	27.4	17.1	19.8	13.3	26.7	3.6
Incr Delay (d2), s/veh	0.6	0.5	21.5	0.2	13.7	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	1.0	2.5	13.7	1.4	6.1	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.0	17.5	41.3	13.5	40.5	3.8
LnGrp LOS	C	B	D	B	D	A
Approach Vol, veh/h	276		868			663
Approach Delay, s/veh	19.9		36.1			21.6
Approach LOS	B		D			C

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	20.6	35.6				56.2	14.6
Change Period (Y+Rc), s	5.1	5.8				5.8	4.9
Max Green Setting (Gmax), s	15.5	30.2				49.2	14.1
Max Q Clear Time (g_c+I1), s	15.1	29.4				6.9	9.4
Green Ext Time (p_c), s	0.4	0.4				2.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	28.3
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	1.6	1.9	1.0
Total Del/Veh (s)	16.1	9.4	13.4	14.0	12.0

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

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.1	0.0	0.4	2.8	0.8
Total Del/Veh (s)	11.0	12.3	14.1	36.7	18.8

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)	7.6	7.5	25.8	12.9

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)	11.8	20.3	17.9	5.2	13.6

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 Flows Total veh/h	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	0.275	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.

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



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	1841	1811	1870	1722	1811	1485
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, %	4	6	2	12	6	28
Cap, veh/h	366	52	101	1113	327	695
Arrive On Green	0.23	0.23	0.36	0.36	0.19	0.19
Sat Flow, veh/h	1577	223	278	3152	1725	1259
Grp Volume(v), veh/h	0	339	546	476	167	296
Grp Sat Flow(s),veh/h/ln	0	1801	1708	1636	1725	1259
Q Serve(g_s), s	0.0	11.7	19.6	17.1	5.7	9.0
Cycle Q Clear(g_c), s	0.0	11.7	19.6	17.1	5.7	9.0
Prop In Lane		0.12	0.16		1.00	1.00
Lane Grp Cap(c), veh/h	0	418	620	594	327	695
V/C Ratio(X)	0.00	0.81	0.88	0.80	0.51	0.43
Avail Cap(c_a), veh/h	0	696	660	633	667	944
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	23.8	19.5	18.7	23.8	8.6
Incr Delay (d2), s/veh	0.0	3.8	12.6	6.9	1.2	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	0.0	5.1	9.2	7.0	2.3	4.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	27.6	32.1	25.7	25.0	9.0
LnGrp LOS	A	C	C	C	C	A
Approach Vol, veh/h	339			1022	463	
Approach Delay, s/veh	27.6			29.1	14.8	
Approach LOS	C			C	B	

Timer - Assigned Phs		2		4		8
Phs Duration (G+Y+Rc), s		17.1		19.9		28.5
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+I1), s		11.0		13.7		21.6
Green Ext Time (p_c), s		1.4		1.6		2.2

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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	1322	1841	1870	1796	1826	1870
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, %	39	4	2	7	5	2
Cap, veh/h	743	112	35	1132	158	51
Arrive On Green	0.34	0.34	0.33	0.33	0.12	0.12
Sat Flow, veh/h	2255	329	104	3483	1269	409
Grp Volume(v), veh/h	338	341	514	446	165	0
Grp Sat Flow(s),veh/h/ln	1256	1263	1791	1706	1689	0
Q Serve(g_s), s	16.8	16.9	18.5	16.3	6.6	0.0
Cycle Q Clear(g_c), s	16.8	16.9	18.5	16.3	6.6	0.0
Prop In Lane		0.26	0.06		0.75	0.24
Lane Grp Cap(c), veh/h	426	428	598	570	210	0
V/C Ratio(X)	0.79	0.80	0.86	0.78	0.79	0.00
Avail Cap(c_a), veh/h	733	737	656	625	230	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	20.6	20.7	21.5	20.8	29.4	0.0
Incr Delay (d2), s/veh	3.4	3.4	10.5	5.9	15.2	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	4.9	5.0	8.9	6.9	3.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.0	24.1	32.0	26.7	44.5	0.0
LnGrp LOS	C	C	C	C	D	A
Approach Vol, veh/h	679			960	165	
Approach Delay, s/veh	24.0			29.5	44.5	
Approach LOS	C			C	D	

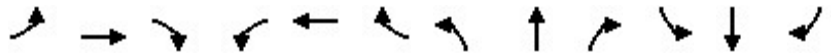
Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	13.2	28.1	27.8
Change Period (Y+Rc), s	4.6	* 4.7	4.7
Max Green Setting (Gmax), s	9.4	* 40	25.3
Max Q Clear Time (g_c+I1), s	8.6	18.9	20.5
Green Ext Time (p_c), s	0.0	4.5	2.5

Intersection Summary	
HCM 6th Ctrl Delay	28.8
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.



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	
Adj Sat Flow, veh/h/ln	1870	1870	1826	1870	1870	1870	1841	1826	1870	1870	1722	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	5	2	2	2	4	5	2	2	12	2
Cap, veh/h	9	230	481	79	95	151	320	662	82	159	1049	29
Arrive On Green	0.13	0.13	0.13	0.10	0.10	0.10	0.18	0.42	0.42	0.09	0.32	0.32
Sat Flow, veh/h	74	1793	1547	829	1000	1585	1753	1592	198	1781	3254	89
Grp Volume(v), veh/h	76	0	262	64	0	109	281	0	713	152	277	289
Grp Sat Flow(s),veh/h/ln	1867	0	1547	1829	0	1585	1753	0	1790	1781	1636	1706
Q Serve(g_s), s	2.9	0.0	9.9	2.5	0.0	5.2	12.1	0.0	29.9	6.6	10.7	10.7
Cycle Q Clear(g_c), s	2.9	0.0	9.9	2.5	0.0	5.2	12.1	0.0	29.9	6.6	10.7	10.7
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	239	0	481	174	0	151	320	0	744	159	527	550
V/C Ratio(X)	0.32	0.00	0.54	0.37	0.00	0.72	0.88	0.00	0.96	0.96	0.52	0.53
Avail Cap(c_a), veh/h	239	0	481	353	0	306	338	0	749	159	527	550
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	30.6	0.0	22.1	32.8	0.0	34.0	30.7	0.0	21.9	35.0	21.3	21.4
Incr Delay (d2), s/veh	0.8	0.0	1.3	1.3	0.0	6.4	21.4	0.0	23.1	57.9	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/ln	1.3	0.0	3.9	1.2	0.0	2.2	6.8	0.0	16.2	5.3	4.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.4	0.0	23.4	34.1	0.0	40.4	52.1	0.0	45.0	92.9	22.3	22.3
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		25.2			38.1			47.0			37.2	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	37.8		15.0	19.2	30.6		12.4
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1
Max Green Setting (Gmax), s	6.9	32.3		9.9	14.9	24.3		14.9
Max Q Clear Time (g_c+I1), s	8.6	31.9		11.9	14.1	12.7		7.2
Green Ext Time (p_c), s	0.0	0.2		0.0	0.1	2.7		0.4

Intersection Summary	
HCM 6th Ctrl Delay	39.8
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	3	4	9	9	4
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	6.945	4.16	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3285	2.238	-	-	-
Pot Cap-1 Maneuver	~ 94	574	773	-	-	-
Stage 1	400	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 90	574	773	-	-	-
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)	773	-	279	574	-	-
HCM Lane V/C Ratio	0.039	-	0.728	0.167	-	-
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	53.9
Intersection LOS	F

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	4	2	9	2	4	9	3
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	12.1	12.8	29.1	79.8
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	0.793	0.171	0.273	0.28	1.114
Departure Headway (Hd)	7.079	6.635	7.575	7.126	6.607	6.101
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	509	551	477	508	545	598
Service Time	4.779	4.335	5.575	5.126	4.348	3.842
HCM Lane V/C Ratio	0.043	0.806	0.178	0.281	0.281	1.1
HCM Control Delay	10.1	30.1	12.1	12.8	11.9	95.6
HCM Lane LOS	B	D	B	B	B	F
HCM 95th-tile Q	0.1	7.5	0.6	1.1	1.1	20.4

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	3	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	9	9	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	-



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	1722	1752	1870	1796	1870	1767
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, %	12	10	2	7	2	9
Cap, veh/h	593	511	43	858	481	53
Arrive On Green	0.34	0.34	0.02	0.48	0.30	0.30
Sat Flow, veh/h	1722	1485	1781	1796	1581	175
Grp Volume(v), veh/h	435	182	16	512	462	0
Grp Sat Flow(s),veh/h/ln	1722	1485	1781	1796	1760	0
Q Serve(g_s), s	9.6	4.0	0.4	9.0	10.7	0.0
Cycle Q Clear(g_c), s	9.6	4.0	0.4	9.0	10.7	0.0
Prop In Lane		1.00	1.00		0.90	0.10
Lane Grp Cap(c), veh/h	593	511	43	858	536	0
V/C Ratio(X)	0.73	0.36	0.37	0.60	0.86	0.00
Avail Cap(c_a), veh/h	1210	1043	302	1054	624	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	12.4	10.6	20.7	8.2	14.1	0.0
Incr Delay (d2), s/veh	1.8	0.4	5.2	0.7	10.6	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	3.2	1.1	0.2	2.6	5.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.2	11.0	25.9	8.9	24.7	0.0
LnGrp LOS	B	B	C	A	C	A
Approach Vol, veh/h	617			528	462	
Approach Delay, s/veh	13.2			9.4	24.7	
Approach LOS	B			A	C	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		17.8	5.7	19.5		25.3
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		12.7	2.4	11.6		11.0
Green Ext Time (p_c), s		0.5	0.0	3.3		2.9

Intersection Summary	
HCM 6th Ctrl Delay	15.3
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.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	18.8
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	8	3	2	2	4
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	24.8	17	14.3
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)	0.749	0.588	0.389	0.459
Departure Headway (Hd)	5.971	5.838	7.296	6.107
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	616	491	587
Service Time	4.036	3.908	5.068	3.878
HCM Lane V/C Ratio	0.747	0.588	0.391	0.462
HCM Control Delay	24.8	17	14.7	14
HCM Lane LOS	C	C	B	B
HCM 95th-tile Q	6.6	3.8	1.8	2.4

Intersection	
Intersection Delay, s/veh	279.9
Intersection LOS	F

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
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



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	1781	1767	1826	1767	1767
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	8	9	5	9	9
Cap, veh/h	444	551	616	540	185	973
Arrive On Green	0.26	0.26	0.35	0.35	0.11	0.55
Sat Flow, veh/h	1739	1510	1767	1547	1682	1767
Grp Volume(v), veh/h	171	395	511	52	143	682
Grp Sat Flow(s),veh/h/ln	1739	1510	1767	1547	1682	1767
Q Serve(g_s), s	4.5	12.4	14.6	1.3	4.6	15.6
Cycle Q Clear(g_c), s	4.5	12.4	14.6	1.3	4.6	15.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	444	551	616	540	185	973
V/C Ratio(X)	0.39	0.72	0.83	0.10	0.77	0.70
Avail Cap(c_a), veh/h	444	551	966	846	606	1574
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	15.1	16.5	12.1	23.9	9.1
Incr Delay (d2), s/veh	0.5	4.4	3.6	0.1	6.7	0.9
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	4.3	5.2	0.4	1.9	3.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.5	19.5	20.0	12.2	30.6	10.0
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	566		563			825
Approach Delay, s/veh	18.9		19.3			13.6
Approach LOS	B		B			B

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	31.2	25.1				36.2	19.0
Change Period (Y+Rc), s	5.1	5.8				5.8	4.9
Max Green Setting (Gmax), s	19.3	30.2				49.2	14.1
Max Q Clear Time (g_c+I1), s	16.6	16.6				17.6	14.4
Green Ext Time (p_c), s	0.3	2.6				4.7	0.0

Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B

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

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	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	1.6	2.2	1.2
Total Del/Veh (s)	21.4	12.0	19.6	19.4	16.6

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	0.7
Total Del/Veh (s)	15.1	14.4	22.8	37.2	20.9

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)	9.3	10.2	28.5	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)	21.0	41.4	44.6	16.4	31.2

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)	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

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)	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 Flows Total veh/h	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	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



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	1856	1870	1826	1441	1737	1693
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, %	3	2	5	31	11	14
Cap, veh/h	328	23	83	394	536	710
Arrive On Green	0.19	0.19	0.17	0.17	0.32	0.32
Sat Flow, veh/h	1716	118	486	2371	1654	1434
Grp Volume(v), veh/h	0	249	140	122	129	461
Grp Sat Flow(s),veh/h/ln	0	1834	1416	1369	1654	1434
Q Serve(g_s), s	0.0	5.7	4.1	3.6	2.6	10.7
Cycle Q Clear(g_c), s	0.0	5.7	4.1	3.6	2.6	10.7
Prop In Lane		0.06	0.34		1.00	1.00
Lane Grp Cap(c), veh/h	0	351	242	234	536	710
V/C Ratio(X)	0.00	0.71	0.58	0.52	0.24	0.65
Avail Cap(c_a), veh/h	0	1032	797	770	931	1053
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	17.0	17.1	17.0	11.1	8.4
Incr Delay (d2), s/veh	0.0	2.7	2.2	1.8	0.2	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	0.0	2.3	1.3	1.1	0.8	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	19.7	19.3	18.7	11.4	9.4
LnGrp LOS	A	B	B	B	B	A
Approach Vol, veh/h	249			262	590	
Approach Delay, s/veh	19.7			19.0	9.9	
Approach LOS	B			B	A	

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	19.3	13.3	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+I1), s	12.7	7.7	6.1
Green Ext Time (p_c), s	1.8	1.3	1.4

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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	1693	1826	1870	1544	1826	1856
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, %	14	5	2	24	5	3
Cap, veh/h	1041	139	58	527	104	17
Arrive On Green	0.37	0.37	0.20	0.20	0.07	0.07
Sat Flow, veh/h	2935	381	297	2777	1446	236
Grp Volume(v), veh/h	353	358	134	116	58	0
Grp Sat Flow(s),veh/h/ln	1608	1624	1529	1467	1711	0
Q Serve(g_s), s	6.8	6.8	2.9	2.6	1.2	0.0
Cycle Q Clear(g_c), s	6.8	6.8	2.9	2.6	1.2	0.0
Prop In Lane		0.23	0.19		0.84	0.14
Lane Grp Cap(c), veh/h	587	593	298	286	124	0
V/C Ratio(X)	0.60	0.60	0.45	0.41	0.47	0.00
Avail Cap(c_a), veh/h	1701	1718	1016	975	467	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	9.8	9.8	13.5	13.4	17.0	0.0
Incr Delay (d2), s/veh	1.0	1.0	1.1	0.9	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	1.9	1.9	0.9	0.8	0.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.8	10.8	14.6	14.3	19.7	0.0
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	711			250	58	
Approach Delay, s/veh	10.8			14.5	19.7	
Approach LOS	B			B	B	

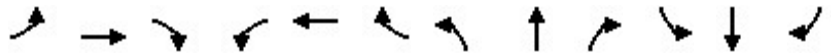
Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	7.4	18.6	12.1
Change Period (Y+Rc), s	4.6	* 4.7	4.7
Max Green Setting (Gmax), s	10.4	* 40	25.3
Max Q Clear Time (g_c+I1), s	3.2	8.8	4.9
Green Ext Time (p_c), s	0.1	5.1	1.4

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.



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	1781	1870	1870	1870	1722	1648	1870	1870	1693	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	8	2	2	2	12	17	2	2	14	2
Cap, veh/h	0	226	358	135	91	198	191	430	19	32	571	9
Arrive On Green	0.00	0.12	0.12	0.12	0.12	0.12	0.12	0.27	0.27	0.02	0.18	0.18
Sat Flow, veh/h	0	1870	1510	1084	732	1585	1640	1566	69	1781	3243	49
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	1510	1816	0	1585	1640	0	1636	1781	1608	1684
Q Serve(g_s), s	0.0	0.1	4.1	3.2	0.0	2.6	4.0	0.0	6.9	0.4	4.2	4.2
Cycle Q Clear(g_c), s	0.0	0.1	4.1	3.2	0.0	2.6	4.0	0.0	6.9	0.4	4.2	4.2
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	226	358	227	0	198	191	0	449	32	283	296
V/C Ratio(X)	0.00	0.02	0.45	0.59	0.00	0.49	0.78	0.00	0.63	0.44	0.58	0.58
Avail Cap(c_a), veh/h	0	407	504	595	0	520	538	0	1054	270	860	900
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	17.6	14.8	18.8	0.0	18.5	19.5	0.0	14.5	22.1	17.2	17.2
Incr Delay (d2), s/veh	0.0	0.0	0.9	2.4	0.0	1.9	6.8	0.0	1.5	9.3	1.9	1.8
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	1.3	1.3	0.0	0.9	1.6	0.0	2.1	0.2	1.4	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.7	15.7	21.2	0.0	20.4	26.3	0.0	15.9	31.4	19.0	19.0
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			20.9			19.5			19.5	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	5.9	18.2		10.6	10.4	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	6.9	29.3		9.9	14.9	24.3		14.9
Max Q Clear Time (g_c+I1), s	2.4	8.9		6.1	6.0	6.2		5.2
Green Ext Time (p_c), s	0.0	1.4		0.2	0.2	1.6		0.7

Intersection Summary	
HCM 6th Ctrl Delay	19.2
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	3	4	9	9	4
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	6.945	4.16	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3285	2.238	-	-	-
Pot Cap-1 Maneuver	248	727	1017	-	-	-
Stage 1	586	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	233	727	1017	-	-	-
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)	1017	-	433	727	-	-
HCM Lane V/C Ratio	0.06	-	0.05	0.045	-	-
HCM Control Delay (s)	8.8	-	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	13.4
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, %	3	2	2	2	2	4	2	9	2	3	9	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	9.6	10.1	16.3	11.2
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	0.615	0.103	0.221	0.047	0.342
Departure Headway (Hd)	5.95	5.553	5.898	5.509	6.172	5.726
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	604	650	607	652	582	628
Service Time	3.669	3.273	3.936	3.542	3.895	3.449
HCM Lane V/C Ratio	0.041	0.614	0.104	0.222	0.046	0.342
HCM Control Delay	8.9	16.8	9.6	10.1	9.2	11.4
HCM Lane LOS	A	C	A	B	A	B
HCM 95th-tile Q	0.1	4.2	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, %	3	13	10	5	3	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	4.13	-	-	-	6.43	6.22
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.227	-	-	-	3.527	3.318
Pot Cap-1 Maneuver	1431	-	-	0	555	902
Stage 1	-	-	-	0	880	-
Stage 2	-	-	-	0	735	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	1431	-	-	-	503	902
Mov Cap-2 Maneuver	-	-	-	-	503	-
Stage 1	-	-	-	-	798	-
Stage 2	-	-	-	-	735	-

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)	1431	-	-	503	902
HCM Lane V/C Ratio	0.093	-	-	0.279	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	9	9	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, %	3	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	-



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	1841	1781	1870	1781	1826	1870
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, %	4	8	2	8	5	2
Cap, veh/h	604	495	23	956	109	12
Arrive On Green	0.33	0.33	0.01	0.54	0.07	0.07
Sat Flow, veh/h	1841	1510	1781	1781	1517	169
Grp Volume(v), veh/h	191	273	8	162	51	0
Grp Sat Flow(s),veh/h/ln	1841	1510	1781	1781	1720	0
Q Serve(g_s), s	1.9	3.6	0.1	1.1	0.7	0.0
Cycle Q Clear(g_c), s	1.9	3.6	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	604	495	23	956	124	0
V/C Ratio(X)	0.32	0.55	0.35	0.17	0.41	0.00
Avail Cap(c_a), veh/h	2322	1904	541	1876	1095	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	6.1	6.6	11.8	2.8	10.7	0.0
Incr Delay (d2), s/veh	0.3	1.0	8.6	0.1	2.2	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	0.7	0.1	0.1	0.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.4	7.6	20.4	2.9	12.8	0.0
LnGrp LOS	A	A	C	A	B	A
Approach Vol, veh/h	464			170	51	
Approach Delay, s/veh	7.1			3.7	12.8	
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	5.6	3.1
Green Ext Time (p_c), s	0.1	0.0	2.1	0.8

Intersection Summary	
HCM 6th Ctrl Delay	6.7
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	8.5
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, %	3	3	7	2	2	3
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	8.4	8.2
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)	0.219	0.221	0.056	0.076
Departure Headway (Hd)	4.444	4.214	5.843	4.652
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	810	855	614	771
Service Time	2.458	2.228	3.568	2.377
HCM Lane V/C Ratio	0.219	0.221	0.057	0.077
HCM Control Delay	8.7	8.4	8.9	7.8
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



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	1796	1767	1826	1767	1767
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	7	9	5	9	9
Cap, veh/h	165	414	535	469	297	1090
Arrive On Green	0.10	0.10	0.30	0.30	0.18	0.62
Sat Flow, veh/h	1739	1522	1767	1547	1682	1767
Grp Volume(v), veh/h	33	86	370	138	227	212
Grp Sat Flow(s),veh/h/ln	1739	1522	1767	1547	1682	1767
Q Serve(g_s), s	0.7	1.6	6.9	2.5	4.8	1.9
Cycle Q Clear(g_c), s	0.7	1.6	6.9	2.5	4.8	1.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	165	414	535	469	297	1090
V/C Ratio(X)	0.20	0.21	0.69	0.29	0.76	0.19
Avail Cap(c_a), veh/h	660	846	1435	1257	901	2338
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	15.5	10.4	11.4	9.9	14.6	3.1
Incr Delay (d2), s/veh	0.6	0.2	1.6	0.3	4.1	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	16.1	10.7	13.0	10.3	18.6	3.2
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	119		508			439
Approach Delay, s/veh	12.2		12.3			11.2
Approach LOS	B		B			B

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	11.7	17.1				28.7	8.4
Change Period (Y+Rc), s	5.1	5.8				5.8	4.9
Max Green Setting (Gmax), s	19.3	30.2				49.2	14.1
Max Q Clear Time (g_c+I1), s	16.8	8.9				3.9	3.6
Green Ext Time (p_c), s	0.5	2.4				1.2	0.2

Intersection Summary	
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	0.0
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	1.5	2.1	1.0
Total Del/Veh (s)	13.8	4.7	7.9	6.8	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	0.9
Total Del/Veh (s)	4.5	8.8	27.6	39.4	17.9

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)	2.3	3.5	19.2	7.9

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)	5.4	8.5	10.7	0.9	5.1

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

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)	5.6	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 Flows Total veh/h	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	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



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	1841	1811	1870	1722	1811	1485
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, %	4	6	2	12	6	28
Cap, veh/h	435	63	92	949	332	634
Arrive On Green	0.28	0.28	0.31	0.31	0.19	0.19
Sat Flow, veh/h	1571	229	296	3133	1725	1259
Grp Volume(v), veh/h	0	417	426	372	191	276
Grp Sat Flow(s),veh/h/ln	0	1800	1707	1636	1725	1259
Q Serve(g_s), s	0.0	14.0	14.7	13.0	6.5	9.0
Cycle Q Clear(g_c), s	0.0	14.0	14.7	13.0	6.5	9.0
Prop In Lane		0.13	0.17		1.00	1.00
Lane Grp Cap(c), veh/h	0	498	532	510	332	634
V/C Ratio(X)	0.00	0.84	0.80	0.73	0.58	0.44
Avail Cap(c_a), veh/h	0	709	673	645	680	888
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	21.9	20.3	19.7	23.6	10.1
Incr Delay (d2), s/veh	0.0	6.1	5.5	3.1	1.6	0.5
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	6.3	6.2	5.0	2.6	4.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	28.0	25.8	22.8	25.1	10.6
LnGrp LOS	A	C	C	C	C	B
Approach Vol, veh/h	417			798	467	
Approach Delay, s/veh	28.0			24.4	16.5	
Approach LOS	C			C	B	

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	17.0	22.5	24.7
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	11.0	16.0	16.7
Green Ext Time (p_c), s	1.4	1.8	3.3

Intersection Summary	
HCM 6th Ctrl Delay	23.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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	1322	1841	1870	1796	1826	1870
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, %	39	4	2	7	5	2
Cap, veh/h	708	132	50	968	168	77
Arrive On Green	0.34	0.34	0.29	0.29	0.15	0.15
Sat Flow, veh/h	2178	395	171	3413	1142	524
Grp Volume(v), veh/h	322	323	398	345	198	0
Grp Sat Flow(s),veh/h/ln	1256	1251	1788	1706	1674	0
Q Serve(g_s), s	14.2	14.3	12.5	11.1	7.1	0.0
Cycle Q Clear(g_c), s	14.2	14.3	12.5	11.1	7.1	0.0
Prop In Lane		0.32	0.10		0.68	0.31
Lane Grp Cap(c), veh/h	421	419	521	497	246	0
V/C Ratio(X)	0.77	0.77	0.76	0.69	0.80	0.00
Avail Cap(c_a), veh/h	818	815	731	698	255	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	18.4	18.4	20.0	19.5	25.5	0.0
Incr Delay (d2), s/veh	2.9	3.0	3.1	1.8	16.5	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	4.0	4.1	5.2	4.3	3.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.3	21.4	23.1	21.2	42.0	0.0
LnGrp LOS	C	C	C	C	D	A
Approach Vol, veh/h	645			743	198	
Approach Delay, s/veh	21.4			22.2	42.0	
Approach LOS	C			C	D	

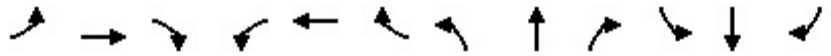
Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	13.7	25.4	22.7
Change Period (Y+Rc), s	4.6	* 4.7	4.7
Max Green Setting (Gmax), s	9.4	* 40	25.3
Max Q Clear Time (g_c+I1), s	9.1	16.3	14.5
Green Ext Time (p_c), s	0.0	4.4	3.5

Intersection Summary	
HCM 6th Ctrl Delay	24.3
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.



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	
Adj Sat Flow, veh/h/ln	1870	1870	1826	1870	1870	1870	1841	1826	1870	1870	1722	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	5	2	2	2	4	5	2	2	12	2
Cap, veh/h	10	238	423	70	68	121	246	668	79	165	1199	35
Arrive On Green	0.13	0.13	0.13	0.08	0.08	0.08	0.14	0.42	0.42	0.09	0.37	0.37
Sat Flow, veh/h	78	1789	1547	926	898	1585	1753	1603	189	1781	3247	94
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	1547	1824	0	1585	1753	0	1792	1781	1636	1705
Q Serve(g_s), s	2.6	0.0	9.5	2.6	0.0	3.3	8.4	0.0	28.0	6.0	8.9	8.9
Cycle Q Clear(g_c), s	2.6	0.0	9.5	2.6	0.0	3.3	8.4	0.0	28.0	6.0	8.9	8.9
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	248	0	423	139	0	121	246	0	747	165	604	630
V/C Ratio(X)	0.29	0.00	0.55	0.48	0.00	0.61	0.83	0.00	0.94	0.89	0.43	0.43
Avail Cap(c_a), veh/h	248	0	423	365	0	317	350	0	776	165	604	630
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	29.2	0.0	23.2	33.0	0.0	33.4	31.2	0.0	20.8	33.4	17.6	17.7
Incr Delay (d2), s/veh	0.6	0.0	1.5	2.6	0.0	4.8	10.4	0.0	18.8	39.3	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	1.2	0.0	3.5	1.2	0.0	1.4	4.1	0.0	14.5	4.3	3.2	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	0.0	24.6	35.6	0.0	38.2	41.6	0.0	39.6	72.8	18.1	18.1
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		25.9			37.0			40.1			29.9	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	12.0	36.8		15.0	15.6	33.2		10.8
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1
Max Green Setting (Gmax), s	6.9	32.3		9.9	14.9	24.3		14.9
Max Q Clear Time (g_c+I1), s	8.0	30.0		11.5	10.4	10.9		5.3
Green Ext Time (p_c), s	0.0	1.1		0.0	0.2	2.7		0.3

Intersection Summary	
HCM 6th Ctrl Delay	34.3
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	3	4	9	9	4
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	6.945	4.16	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3285	2.238	-	-	-
Pot Cap-1 Maneuver	~ 121	626	853	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 114	626	853	-	-	-
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)	853	-	309	626	-	-
HCM Lane V/C Ratio	0.059	-	0.47	0.194	-	-
HCM Control Delay (s)	9.5	-	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	29.4
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	4	2	9	2	4	9	3
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	11.9	11.8	24.7	37.8
HCM LOS	B	B	C	E

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	0.742	0.178	0.236	0.245	0.923
Departure Headway (Hd)	6.722	6.293	7.284	6.76	6.432	5.928
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	528	569	495	534	554	605
Service Time	4.515	4.087	5.293	4.766	4.217	3.711
HCM Lane V/C Ratio	0.027	0.745	0.178	0.236	0.247	0.927
HCM Control Delay	9.7	25.2	11.9	11.8	11.3	44.3
HCM Lane LOS	A	D	B	B	B	E
HCM 95th-tile Q	0.1	6.4	0.6	0.9	1	11.8

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	3	2	2
Mvmt Flow	99	235	208	310	380	127

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	208	0	-	0	641	208
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	433	-
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	439	832
Stage 1	-	-	-	0	827	-
Stage 2	-	-	-	0	654	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	1363	-	-	-	407	832
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	9	9	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	-



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	1722	1752	1900	1796	1870	1767
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, %	12	10	0	7	2	9
Cap, veh/h	527	454	39	820	451	50
Arrive On Green	0.31	0.31	0.02	0.46	0.29	0.29
Sat Flow, veh/h	1722	1485	1810	1796	1580	175
Grp Volume(v), veh/h	350	159	14	417	402	0
Grp Sat Flow(s),veh/h/ln	1722	1485	1810	1796	1760	0
Q Serve(g_s), s	6.4	3.0	0.3	6.0	7.7	0.0
Cycle Q Clear(g_c), s	6.4	3.0	0.3	6.0	7.7	0.0
Prop In Lane		1.00	1.00		0.90	0.10
Lane Grp Cap(c), veh/h	527	454	39	820	502	0
V/C Ratio(X)	0.66	0.35	0.36	0.51	0.80	0.00
Avail Cap(c_a), veh/h	1433	1235	363	1248	739	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	11.0	9.8	17.6	7.0	12.1	0.0
Incr Delay (d2), s/veh	1.4	0.5	5.4	0.5	3.9	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	2.0	0.8	0.2	1.5	2.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.5	10.3	22.9	7.5	16.0	0.0
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	509			431	402	
Approach Delay, s/veh	11.8			8.0	16.0	
Approach LOS	B			A	B	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		15.1	5.5	15.8		21.3
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		9.7	2.3	8.4		8.0
Green Ext Time (p_c), s		0.7	0.0	2.7		2.4

Intersection Summary	
HCM 6th Ctrl Delay	11.8
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	8	3	2	2	4
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	13.3	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	0.463	0.33	0.398
Departure Headway (Hd)	5.701	5.535	6.919	5.734
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	634	650	519	628
Service Time	3.746	3.584	4.665	3.48
HCM Lane V/C Ratio	0.614	0.463	0.331	0.398
HCM Control Delay	17.5	13.3	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	214.3
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



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	1781	1767	1826	1767	1767
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	8	9	5	9	9
Cap, veh/h	426	595	557	488	252	987
Arrive On Green	0.24	0.24	0.32	0.32	0.15	0.56
Sat Flow, veh/h	1739	1510	1767	1547	1682	1767
Grp Volume(v), veh/h	199	379	448	85	198	500
Grp Sat Flow(s),veh/h/ln	1739	1510	1767	1547	1682	1767
Q Serve(g_s), s	5.3	11.0	12.7	2.2	6.2	9.5
Cycle Q Clear(g_c), s	5.3	11.0	12.7	2.2	6.2	9.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	426	595	557	488	252	987
V/C Ratio(X)	0.47	0.64	0.80	0.17	0.79	0.51
Avail Cap(c_a), veh/h	451	617	981	859	616	1598
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	17.5	13.3	17.1	13.5	22.3	7.4
Incr Delay (d2), s/veh	0.8	2.1	2.8	0.2	5.4	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	2.0	3.5	4.5	0.6	2.5	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.3	15.4	19.9	13.7	27.7	7.8
LnGrp LOS	B	B	B	B	C	A
Approach Vol, veh/h	578		533			698
Approach Delay, s/veh	16.4		18.9			13.4
Approach LOS	B		B			B

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	13.2	22.9				36.2	18.2
Change Period (Y+Rc), s	5.1	5.8				5.8	4.9
Max Green Setting (Gmax), s	19.3	30.2				49.2	14.1
Max Q Clear Time (g_c+I1), s	8.2	14.7				11.5	13.0
Green Ext Time (p_c), s	0.4	2.5				3.1	0.3

Intersection Summary	
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)	0.0	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	1.1
Total Del/Veh (s)	16.7	10.5	16.9	16.3	14.1

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	0.5
Total Del/Veh (s)	12.2	13.8	18.0	33.2	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)	10.6	10.1	29.6	15.0

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)	20.9	40.1	42.9	14.8	29.9

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

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)	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 Flows Total veh/h	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	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.

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



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	1841	1811	1870	1722	1811	1485
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, %	4	6	2	12	6	28
Cap, veh/h	276	56	48	684	343	526
Arrive On Green	0.19	0.19	0.22	0.22	0.20	0.20
Sat Flow, veh/h	1483	303	221	3213	1725	1259
Grp Volume(v), veh/h	0	177	194	168	79	139
Grp Sat Flow(s),veh/h/ln	0	1786	1711	1636	1725	1259
Q Serve(g_s), s	0.0	3.2	3.5	3.2	1.4	2.6
Cycle Q Clear(g_c), s	0.0	3.2	3.5	3.2	1.4	2.6
Prop In Lane		0.17	0.13		1.00	1.00
Lane Grp Cap(c), veh/h	0	332	374	358	343	526
V/C Ratio(X)	0.00	0.53	0.52	0.47	0.23	0.26
Avail Cap(c_a), veh/h	0	1271	1218	1164	1227	1171
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	13.1	12.2	12.1	12.0	6.8
Incr Delay (d2), s/veh	0.0	1.3	1.1	1.0	0.3	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	0.0	1.1	1.2	1.0	0.4	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	14.4	13.3	13.1	12.3	7.0
LnGrp LOS	A	B	B	B	B	A
Approach Vol, veh/h	177			362	218	
Approach Delay, s/veh	14.4			13.2	8.9	
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+I1), s	4.6	5.2	5.5
Green Ext Time (p_c), s	0.6	0.9	2.0

Intersection Summary	
HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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	1322	1841	1870	1796	1826	1870
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, %	39	4	2	7	5	2
Cap, veh/h	525	20	5	758	187	93
Arrive On Green	0.21	0.21	0.22	0.22	0.17	0.17
Sat Flow, veh/h	2535	92	21	3570	1094	547
Grp Volume(v), veh/h	135	142	171	147	52	0
Grp Sat Flow(s),veh/h/ln	1256	1305	1795	1706	1673	0
Q Serve(g_s), s	3.3	3.4	2.9	2.6	0.9	0.0
Cycle Q Clear(g_c), s	3.3	3.4	2.9	2.6	0.9	0.0
Prop In Lane		0.07	0.01		0.65	0.33
Lane Grp Cap(c), veh/h	267	278	391	371	286	0
V/C Ratio(X)	0.51	0.51	0.44	0.40	0.18	0.00
Avail Cap(c_a), veh/h	1442	1499	1294	1230	448	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	12.2	11.9	11.8	12.5	0.0
Incr Delay (d2), s/veh	1.5	1.5	0.8	0.7	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	0.9	1.0	0.8	0.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	13.7	12.6	12.4	12.8	0.0
LnGrp LOS	B	B	B	B	B	A
Approach Vol, veh/h	277			318	52	
Approach Delay, s/veh	13.7			12.5	12.8	
Approach LOS	B			B	B	

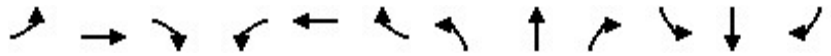
Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	10.6	12.2	12.3
Change Period (Y+Rc), s	4.6	* 4.7	4.7
Max Green Setting (Gmax), s	9.4	* 40	25.3
Max Q Clear Time (g_c+I1), s	2.9	5.4	4.9
Green Ext Time (p_c), s	0.0	1.8	1.7

Intersection Summary	
HCM 6th Ctrl Delay	13.0
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.



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	1826	1870	1870	1870	1841	1826	1870	1870	1722	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	5	2	2	2	4	5	2	2	12	2
Cap, veh/h	6	231	342	105	64	148	164	385	54	145	782	2
Arrive On Green	0.13	0.13	0.13	0.09	0.09	0.09	0.09	0.25	0.25	0.08	0.23	0.23
Sat Flow, veh/h	49	1819	1547	1129	685	1585	1753	1566	220	1781	3347	10
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	1547	1814	0	1585	1753	0	1786	1781	1636	1720
Q Serve(g_s), s	0.8	0.0	4.2	1.1	0.0	1.5	2.5	0.0	7.5	2.8	4.0	4.0
Cycle Q Clear(g_c), s	0.8	0.0	4.2	1.1	0.0	1.5	2.5	0.0	7.5	2.8	4.0	4.0
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	237	0	342	169	0	148	164	0	440	145	382	402
V/C Ratio(X)	0.16	0.00	0.47	0.27	0.00	0.37	0.61	0.00	0.72	0.75	0.43	0.43
Avail Cap(c_a), veh/h	398	0	475	582	0	509	563	0	1243	265	856	900
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	18.1	0.0	15.7	19.6	0.0	19.8	20.2	0.0	16.0	20.9	15.2	15.2
Incr Delay (d2), s/veh	0.3	0.0	1.0	0.8	0.0	1.5	3.6	0.0	2.2	7.7	0.8	0.7
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	1.4	0.4	0.0	0.6	1.1	0.0	2.9	1.3	1.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.4	0.0	16.7	20.4	0.0	21.3	23.8	0.0	18.3	28.5	15.9	15.9
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		17.0			20.9			19.6			19.0	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.9	17.1		11.0	9.4	16.6		9.4
Change Period (Y+Rc), s	5.1	5.7		5.1	5.1	5.7		5.1
Max Green Setting (Gmax), s	6.9	32.3		9.9	14.9	24.3		14.9
Max Q Clear Time (g_c+I1), s	4.8	9.5		6.2	4.5	6.0		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	19.0
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	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	3	4	9	9	4
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	6.945	4.16	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.3285	2.238	-	-	-
Pot Cap-1 Maneuver	301	734	1027	-	-	-
Stage 1	568	-	-	-	-	-
Stage 2	698	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	298	734	1027	-	-	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	562	-	-	-	-	-
Stage 2	698	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1027	-	481	734	-	-
HCM Lane V/C Ratio	0.011	-	0.077	0.084	-	-
HCM Control Delay (s)	8.5	-	13.1	10.4	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	0.3	-	-

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	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	4	2	9	2	4	9	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	9.7	9.4	11.8	14.5
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	0.397	0.106	0.113	0.155	0.604
Departure Headway (Hd)	5.923	5.506	5.977	5.653	5.706	5.213
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	598	647	603	638	623	685
Service Time	3.718	3.3	3.98	3.655	3.489	2.996
HCM Lane V/C Ratio	0.02	0.402	0.106	0.113	0.157	0.609
HCM Control Delay	8.8	11.9	9.7	9.4	9.5	15.7
HCM Lane LOS	A	B	A	A	A	C
HCM 95th-tile Q	0.1	1.9	0.4	0.4	0.5	4.1

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	3	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	9	9	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	-



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	1722	1752	1870	1796	1870	1767
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, %	12	10	2	7	2	9
Cap, veh/h	455	392	9	790	298	76
Arrive On Green	0.26	0.26	0.00	0.44	0.22	0.22
Sat Flow, veh/h	1722	1485	1781	1796	1365	348
Grp Volume(v), veh/h	142	45	3	126	65	0
Grp Sat Flow(s),veh/h/ln	1722	1485	1781	1796	1739	0
Q Serve(g_s), s	1.8	0.6	0.0	1.2	0.8	0.0
Cycle Q Clear(g_c), s	1.8	0.6	0.0	1.2	0.8	0.0
Prop In Lane		1.00	1.00		0.78	0.20
Lane Grp Cap(c), veh/h	455	392	9	790	379	0
V/C Ratio(X)	0.31	0.11	0.34	0.16	0.17	0.00
Avail Cap(c_a), veh/h	1897	1636	473	1652	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	0.4	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	8.5	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	8.3			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	3.8		3.2
Green Ext Time (p_c), s		0.1	0.0	0.9		0.6

Intersection Summary	
HCM 6th Ctrl Delay	7.5
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	8.1
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	8	3	2	2	4
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	7.7	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	0.099
Departure Headway (Hd)	4.439	4.183	5.585	4.414
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	811	859	643	814
Service Time	2.449	2.195	3.3	2.129
HCM Lane V/C Ratio	0.194	0.101	0.067	0.098
HCM Control Delay	8.5	7.7	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



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	1781	1767	1826	1767	1767
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	8	9	5	9	9
Cap, veh/h	134	279	483	423	181	982
Arrive On Green	0.08	0.08	0.27	0.27	0.11	0.56
Sat Flow, veh/h	1739	1510	1767	1547	1682	1767
Grp Volume(v), veh/h	47	27	291	26	122	465
Grp Sat Flow(s),veh/h/ln	1739	1510	1767	1547	1682	1767
Q Serve(g_s), s	0.7	0.4	4.2	0.4	2.0	4.6
Cycle Q Clear(g_c), s	0.7	0.4	4.2	0.4	2.0	4.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	134	279	483	423	181	982
V/C Ratio(X)	0.35	0.10	0.60	0.06	0.67	0.47
Avail Cap(c_a), veh/h	840	892	1828	1601	1147	2979
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	1.2	0.1	4.3	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	0.3	0.1	1.0	0.1	0.7	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.3	10.0	10.4	7.9	16.8	4.3
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	74		317			587
Approach Delay, s/veh	12.7		10.2			6.9
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	4.6	6.2			6.6	2.7
Green Ext Time (p_c), s	0.2	1.6			2.9	0.1

Intersection Summary	
HCM 6th Ctrl Delay	8.4
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)	18.0	7.3	11.4	11.3	10.0

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)	8.5	12.9	13.3	35.6	16.0

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)	4.6	4.5	23.4	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	16.9	14.0	3.6	10.6

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

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)	6.7	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 Flows Total veh/h	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	4.8	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.



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	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.

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(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	23.2	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				

Intersection Summary			
HCM 6th Ctrl Delay		25.7	
HCM 6th LOS		C	



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.

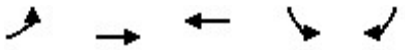
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	196	23	0	72	234	460	52	90	445	14
Future Volume (veh/h)	0	0	196	23	0	72	234	460	52	90	445	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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(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	26.8	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

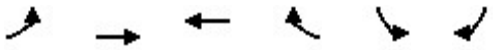
User approved pedestrian interval to be less than phase max green.



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.



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

Intersection Summary	
HCM 6th Ctrl Delay	14.0
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



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

Intersection Summary



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	471			457	341	
Approach Delay, s/veh	10.6			7.3	13.5	
Approach LOS	B			A	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

Intersection Summary	
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 Flows Total veh/h	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.

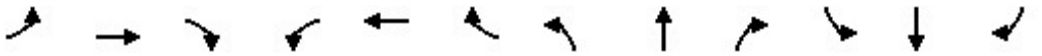
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Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	203	28	50	193	531	89	444	14
v/c Ratio	0.31	0.14	0.14	0.57	0.41	0.27	0.68	0.02
Control Delay	1.2	23.4	0.8	30.4	5.3	14.2	20.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.2	23.4	0.8	30.4	5.3	14.2	20.0	0.1
Queue Length 50th (ft)	0	8	0	52	58	18	111	0
Queue Length 95th (ft)	0	29	0	#153	125	49	212	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	730	286	447	373	1466	486	948	941
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	0.10	0.11	0.52	0.36	0.18	0.47	0.01

Intersection Summary

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



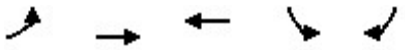
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	191	26	0	47	181	452	47	84	417	13
Future Volume (veh/h)	0	0	191	26	0	47	181	452	47	84	417	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1826	1870	1870	1870	1841	1826	1870	1870	1722	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	5	2	2	2	4	5	2	2	12	2
Cap, veh/h	0	0	288	230	0	288	246	948	99	446	571	525
Arrive On Green	0.00	0.00	0.18	0.18	0.00	0.18	0.14	0.58	0.58	0.33	0.33	0.33
Sat Flow, veh/h	0	0	1585	400	0	1585	1753	1626	169	873	1722	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	400	0	1585	1753	0	1795	873	1722	1585
Q Serve(g_s), s	0.0	0.0	5.5	1.0	0.0	1.2	4.9	0.0	8.0	3.5	10.7	0.3
Cycle Q Clear(g_c), s	0.0	0.0	5.5	6.6	0.0	1.2	4.9	0.0	8.0	3.5	10.7	0.3
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	288	230	0	288	246	0	1046	446	571	525
V/C Ratio(X)	0.00	0.00	0.70	0.12	0.00	0.17	0.79	0.00	0.51	0.20	0.78	0.03
Avail Cap(c_a), veh/h	0	0	345	272	0	345	382	0	1046	651	976	898
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	17.6	20.7	0.0	15.9	19.1	0.0	5.7	11.4	13.8	10.3
Incr Delay (d2), s/veh	0.0	0.0	5.1	0.2	0.0	0.3	5.7	0.0	0.4	0.2	2.3	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	2.2	0.3	0.0	0.4	2.0	0.0	1.4	0.5	3.3	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	22.7	20.9	0.0	16.1	24.8	0.0	6.1	11.6	16.1	10.4
LnGrp LOS	A	A	C	C	A	B	C	A	A	B	B	B
Approach Vol, veh/h		203			78			724			547	
Approach Delay, s/veh		22.7			17.9			11.1			15.3	
Approach LOS		C			B			B			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		32.4		13.4	11.5	20.9		13.4				
Change Period (Y+Rc), s		5.7		5.1	5.1	5.7		5.1				
Max Green Setting (Gmax), s		26.0		10.0	10.0	26.0		10.0				
Max Q Clear Time (g_c+I1), s		10.0		7.5	6.9	12.7		8.6				
Green Ext Time (p_c), s		2.8		0.3	0.1	2.6		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		14.4
HCM 6th LOS		B

Notes

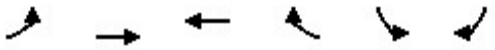
User approved pedestrian interval to be less than phase max green.



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	87	225	503	359	113
v/c Ratio	0.48	0.26	0.79	0.69	0.21
Control Delay	38.7	9.5	23.9	25.5	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	9.5	23.9	25.5	5.0
Queue Length 50th (ft)	30	40	113	109	0
Queue Length 95th (ft)	#94	83	#272	199	30
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	183	1188	833	742	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	0.60	0.48	0.16

Intersection Summary

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



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	1856	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	3	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

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	325	146	11	446	340
v/c Ratio	0.51	0.23	0.04	0.61	0.58
Control Delay	14.7	3.9	22.0	13.5	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	3.9	22.0	13.5	16.7
Queue Length 50th (ft)	46	0	2	68	51
Queue Length 95th (ft)	148	24	16	146	150
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	1005	929	286	1464	1037
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	0.16	0.04	0.30	0.33

Intersection Summary



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	1722	1752	1870	1796	1870	1767
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, %	12	10	2	7	2	9
Cap, veh/h	503	434	31	816	396	53
Arrive On Green	0.29	0.29	0.02	0.45	0.26	0.26
Sat Flow, veh/h	1722	1485	1781	1796	1545	206
Grp Volume(v), veh/h	325	146	11	446	341	0
Grp Sat Flow(s),veh/h/ln	1722	1485	1781	1796	1756	0
Q Serve(g_s), s	5.3	2.5	0.2	5.9	5.8	0.0
Cycle Q Clear(g_c), s	5.3	2.5	0.2	5.9	5.8	0.0
Prop In Lane		1.00	1.00		0.88	0.12
Lane Grp Cap(c), veh/h	503	434	31	816	450	0
V/C Ratio(X)	0.65	0.34	0.35	0.55	0.76	0.00
Avail Cap(c_a), veh/h	1166	1005	329	1216	1189	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	10.0	9.0	15.8	6.4	11.2	0.0
Incr Delay (d2), s/veh	1.4	0.5	6.7	0.6	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	1.6	0.6	0.1	1.3	1.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.4	9.5	22.5	7.0	13.8	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	471			457	341	
Approach Delay, s/veh	10.8			7.4	13.8	
Approach LOS	B			A	B	

Timer - Assigned Phs		2	3	4		8
Phs Duration (G+Y+Rc), s		13.0	5.3	14.2		19.5
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		7.8	2.2	7.3		7.9
Green Ext Time (p_c), s		0.9	0.0	2.2		2.4

Intersection Summary	
HCM 6th Ctrl Delay	10.4
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.

MOVEMENT SUMMARY

Site: 15 [SR 174 / Brunswick Road]

MITIG8 Exist 1530
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	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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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.

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

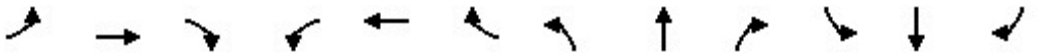
User approved pedestrian interval to be less than phase max green.



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	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.



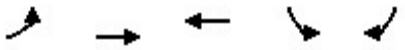
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	209	25	0	76	247	472	57	94	459	14
Future Volume (veh/h)	0	0	209	25	0	76	247	472	57	94	459	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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(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	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

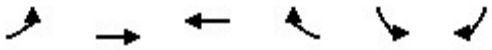
User approved pedestrian interval to be less than phase max green.



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.



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(I)	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.



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



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

Intersection Summary	
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 Flows Total veh/h	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

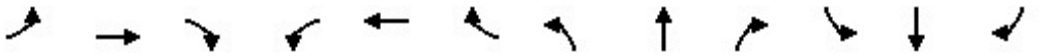
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if 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.



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	0.20	0.15	0.63	0.57	0.43	0.75	0.02
Control Delay	1.7	25.4	0.9	33.2	12.9	31.9	23.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	25.4	0.9	33.2	12.9	31.9	23.3	0.1
Queue Length 50th (ft)	0	8	0	56	120	26	115	0
Queue Length 95th (ft)	0	30	0	#162	228	#84	216	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	650	200	424	345	1070	211	876	879
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	0.14	0.12	0.59	0.50	0.43	0.51	0.02

Intersection Summary

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



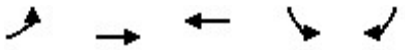
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	200	27	0	49	190	458	50	86	424	13
Future Volume (veh/h)	0	0	200	27	0	49	190	458	50	86	424	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1826	1870	1870	1870	1841	1826	1870	1870	1722	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	5	2	2	2	4	5	2	2	12	2
Cap, veh/h	0	0	299	227	0	299	255	620	67	158	562	517
Arrive On Green	0.00	0.00	0.19	0.19	0.00	0.19	0.15	0.38	0.38	0.09	0.33	0.33
Sat Flow, veh/h	0	0	1585	389	0	1585	1753	1618	176	1781	1722	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	389	0	1585	1753	0	1794	1781	1722	1585
Q Serve(g_s), s	0.0	0.0	5.9	1.1	0.0	1.3	5.2	0.0	12.4	2.3	11.2	0.3
Cycle Q Clear(g_c), s	0.0	0.0	5.9	7.0	0.0	1.3	5.2	0.0	12.4	2.3	11.2	0.3
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	299	227	0	299	255	0	687	158	562	517
V/C Ratio(X)	0.00	0.00	0.71	0.13	0.00	0.17	0.79	0.00	0.79	0.57	0.80	0.03
Avail Cap(c_a), veh/h	0	0	338	256	0	338	374	0	995	228	955	879
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	17.8	21.1	0.0	15.9	19.3	0.0	12.8	20.5	14.4	10.7
Incr Delay (d2), s/veh	0.0	0.0	6.0	0.3	0.0	0.3	6.9	0.0	2.6	3.3	2.7	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	2.4	0.3	0.0	0.4	2.2	0.0	4.0	0.9	3.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	23.8	21.4	0.0	16.2	26.3	0.0	15.4	23.8	17.1	10.7
LnGrp LOS	A	A	C	C	A	B	C	A	B	C	B	B
Approach Vol, veh/h		213			81			742			556	
Approach Delay, s/veh		23.8			18.1			18.4			18.1	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	23.7		13.9	11.9	21.0		13.9				
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	4.3	14.4		7.9	7.2	13.2		9.0				
Green Ext Time (p_c), s	0.0	2.5		0.2	0.1	2.1		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		19.0	
HCM 6th LOS		B	

Notes

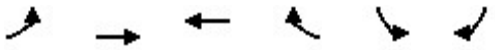
User approved pedestrian interval to be less than phase max green.



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	24.2	25.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	9.5	24.2	25.8	5.0
Queue Length 50th (ft)	30	40	115	112	0
Queue Length 95th (ft)	#95	83	#274	202	30
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	183	1184	830	739	727
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.



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	1856	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	3	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(I)	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

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	374	150	15	481	352
v/c Ratio	0.56	0.23	0.05	0.64	0.60
Control Delay	15.6	3.9	22.6	14.1	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	3.9	22.6	14.1	17.7
Queue Length 50th (ft)	57	0	3	78	60
Queue Length 95th (ft)	173	24	19	161	155
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	966	901	275	1426	995
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	0.17	0.05	0.34	0.35

Intersection Summary



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	1722	1752	1870	1796	1870	1767
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, %	12	10	2	7	2	9
Cap, veh/h	542	467	41	847	397	60
Arrive On Green	0.31	0.31	0.02	0.47	0.26	0.26
Sat Flow, veh/h	1722	1485	1781	1796	1520	228
Grp Volume(v), veh/h	374	150	15	481	353	0
Grp Sat Flow(s),veh/h/ln	1722	1485	1781	1796	1753	0
Q Serve(g_s), s	6.7	2.7	0.3	6.8	6.5	0.0
Cycle Q Clear(g_c), s	6.7	2.7	0.3	6.8	6.5	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	542	467	41	847	458	0
V/C Ratio(X)	0.69	0.32	0.36	0.57	0.77	0.00
Avail Cap(c_a), veh/h	1078	929	304	1124	1097	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	9.2	16.9	6.7	12.0	0.0
Incr Delay (d2), s/veh	1.6	0.4	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	2.1	0.7	0.2	1.6	2.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.1	9.6	22.1	7.3	14.8	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	524			496	353	
Approach Delay, s/veh	11.4			7.8	14.8	
Approach LOS	B			A	B	

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	13.9	5.5	15.8	21.3
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	8.5	2.3	8.7	8.8
Green Ext Time (p_c), s	0.9	0.0	2.4	2.5

Intersection Summary	
HCM 6th Ctrl Delay	11.0
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.

MOVEMENT SUMMARY

Site: 15 [SR 174 / Brunswick Road]

MITIG8 EPAP 1530 PM
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	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.

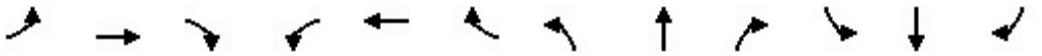
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Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	232	68	114	266	523	40	372	9
v/c Ratio	0.37	0.29	0.31	0.88	0.61	0.19	0.70	0.02
Control Delay	1.7	30.0	3.2	61.3	19.8	29.4	27.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	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.



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(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	25.8	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	

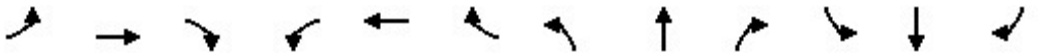
Notes

User approved pedestrian interval to be less than phase max green.



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



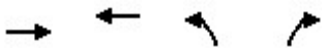
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	23	24	28	57	182	28	531	13	61	283	27
Future Volume (veh/h)	41	23	24	28	57	182	28	531	13	61	283	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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(I)	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+I1), 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.



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.



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(I)	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

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

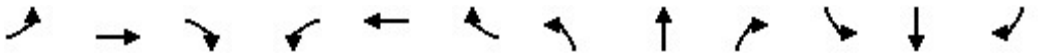


Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	247	26	78	308	573	97	491	14
v/c Ratio	0.42	0.14	0.24	0.94	0.70	0.45	0.79	0.02
Control Delay	2.2	31.8	1.8	69.6	23.1	36.8	30.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.2	31.8	1.8	69.6	23.1	36.8	30.4	0.1
Queue Length 50th (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.



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(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	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

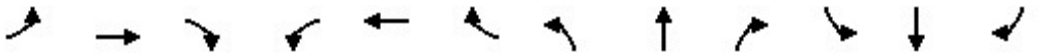
User approved pedestrian interval to be less than phase max green.



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.



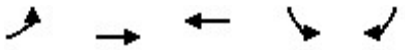
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	29	27	25	44	85	21	393	36	153	550	33
Future Volume (veh/h)	30	29	27	25	44	85	21	393	36	153	550	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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(I)	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

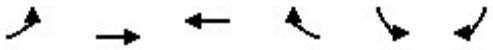
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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.



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.



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

Intersection Summary



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 Flows Total veh/h	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	0.454	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.

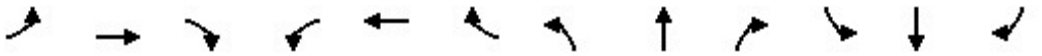
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Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	213	29	52	224	553	91	453	14
v/c Ratio	0.36	0.20	0.15	0.69	0.58	0.44	0.75	0.02
Control Delay	1.7	25.5	0.9	35.9	13.1	32.2	23.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	25.5	0.9	35.9	13.1	32.2	23.5	0.1
Queue Length 50th (ft)	0	8	0	63	124	26	116	0
Queue Length 95th (ft)	0	30	0	#186	235	#84	218	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	646	198	421	341	1062	209	868	872
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	0.15	0.12	0.66	0.52	0.44	0.52	0.02

Intersection Summary

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



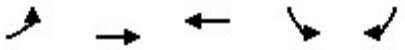
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	200	27	0	49	211	470	50	86	426	13
Future Volume (veh/h)	0	0	200	27	0	49	211	470	50	86	426	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	1826	1870	1870	1870	1841	1826	1870	1870	1722	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	5	2	2	2	4	5	2	2	12	2
Cap, veh/h	0	0	298	221	0	298	279	643	68	156	560	515
Arrive On Green	0.00	0.00	0.19	0.19	0.00	0.19	0.16	0.40	0.40	0.09	0.32	0.32
Sat Flow, veh/h	0	0	1585	384	0	1585	1753	1623	172	1781	1722	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	384	0	1585	1753	0	1795	1781	1722	1585
Q Serve(g_s), s	0.0	0.0	6.1	1.2	0.0	1.3	6.0	0.0	13.0	2.4	11.7	0.3
Cycle Q Clear(g_c), s	0.0	0.0	6.1	7.3	0.0	1.3	6.0	0.0	13.0	2.4	11.7	0.3
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	298	221	0	298	279	0	711	156	560	515
V/C Ratio(X)	0.00	0.00	0.72	0.13	0.00	0.17	0.80	0.00	0.78	0.58	0.81	0.03
Avail Cap(c_a), veh/h	0	0	327	243	0	327	362	0	964	221	924	851
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	18.5	21.9	0.0	16.5	19.6	0.0	12.8	21.3	15.0	11.1
Incr Delay (d2), s/veh	0.0	0.0	6.5	0.3	0.0	0.3	9.6	0.0	2.8	3.4	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	2.5	0.3	0.0	0.5	2.7	0.0	4.2	1.0	3.8	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	25.0	22.1	0.0	16.8	29.3	0.0	15.6	24.7	17.8	11.2
LnGrp LOS	A	A	C	C	A	B	C	A	B	C	B	B
Approach Vol, veh/h		213			81			777			558	
Approach Delay, s/veh		25.0			18.7			19.5			18.8	
Approach LOS		C			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	24.9		14.2	12.8	21.4		14.2				
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	4.4	15.0		8.1	8.0	13.7		9.3				
Green Ext Time (p_c), s	0.0	2.5		0.2	0.1	2.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		20.0
HCM 6th LOS		B

Notes

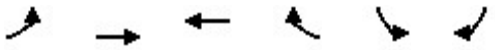
User approved pedestrian interval to be less than phase max green.



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	24.2	26.1	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	9.6	24.2	26.1	4.9
Queue Length 50th (ft)	31	41	116	115	0
Queue Length 95th (ft)	#95	83	#274	205	31
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	182	1182	828	736	728
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.



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	1856	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	3	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.



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	379	150	15	500	352
v/c Ratio	0.56	0.22	0.06	0.65	0.61
Control Delay	15.5	3.8	22.8	14.4	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	3.8	22.8	14.4	18.1
Queue Length 50th (ft)	58	0	3	83	61
Queue Length 95th (ft)	176	24	19	168	155
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	954	891	271	1412	983
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	0.40	0.17	0.06	0.35	0.36

Intersection Summary



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	1722	1752	1870	1796	1870	1767
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, %	12	10	2	7	2	9
Cap, veh/h	546	471	41	850	396	60
Arrive On Green	0.32	0.32	0.02	0.47	0.26	0.26
Sat Flow, veh/h	1722	1485	1781	1796	1520	228
Grp Volume(v), veh/h	379	150	15	500	353	0
Grp Sat Flow(s),veh/h/ln	1722	1485	1781	1796	1753	0
Q Serve(g_s), s	6.8	2.7	0.3	7.2	6.6	0.0
Cycle Q Clear(g_c), s	6.8	2.7	0.3	7.2	6.6	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	546	471	41	850	457	0
V/C Ratio(X)	0.69	0.32	0.36	0.59	0.77	0.00
Avail Cap(c_a), veh/h	1072	924	302	1118	1091	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	10.6	9.2	17.0	6.8	12.1	0.0
Incr Delay (d2), s/veh	1.6	0.4	5.2	0.7	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	2.1	0.7	0.2	1.8	2.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.2	9.6	22.2	7.4	14.9	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	529			515	353	
Approach Delay, s/veh	11.4			7.9	14.9	
Approach LOS	B			A	B	

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	13.9	5.5	15.9	21.4
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	9.2
Green Ext Time (p_c), s	0.9	0.0	2.4	2.6

Intersection Summary	
HCM 6th Ctrl Delay	11.0
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.

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 Flows Total veh/h	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

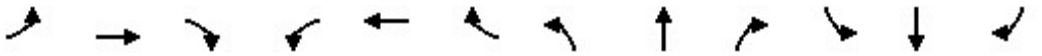
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if 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.



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.



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	

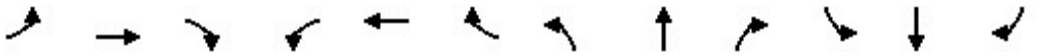
Notes

User approved pedestrian interval to be less than phase max green.



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



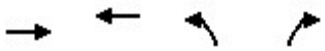
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	23	24	28	57	182	28	531	13	61	283	27
Future Volume (veh/h)	41	23	24	28	57	182	28	531	13	61	283	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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(I)	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+I1), 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.



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.



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(I)	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

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

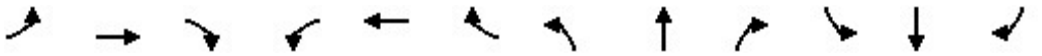


Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	247	26	78	308	582	97	499	14
v/c Ratio	0.42	0.14	0.24	0.94	0.71	0.45	0.79	0.02
Control Delay	2.2	31.9	1.8	70.7	23.4	37.0	30.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.2	31.9	1.8	70.7	23.4	37.0	30.8	0.1
Queue Length 50th (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.



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(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	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

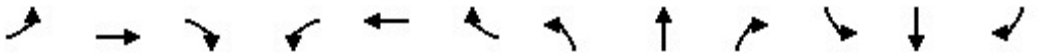
User approved pedestrian interval to be less than phase max green.



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.



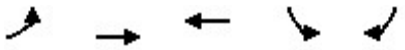
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	29	27	25	44	85	21	393	36	153	550	33
Future Volume (veh/h)	30	29	27	25	44	85	21	393	36	153	550	33
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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(I)	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

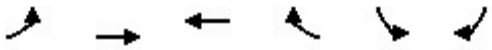
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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.



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.



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

Intersection Summary



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.

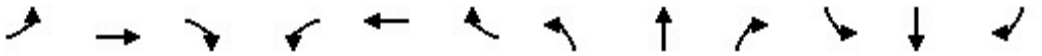
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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	0.20	0.15	0.69	0.59	0.44	0.76	0.02
Control Delay	1.9	25.6	0.9	36.2	13.1	32.3	23.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.9	25.6	0.9	36.2	13.1	32.3	23.8	0.1
Queue Length 50th (ft)	0	8	0	63	127	26	118	0
Queue Length 95th (ft)	0	30	0	#186	240	#84	224	0
Internal Link Dist (ft)	1255	1856			1215		1576	
Turn Bay Length (ft)				550		120		150
Base Capacity (vph)	634	200	420	340	1059	208	864	871
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	0.14	0.12	0.66	0.53	0.44	0.53	0.02

Intersection Summary

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



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	1826	1870	1870	1870	1841	1826	1870	1870	1722	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	5	2	2	2	4	5	2	2	12	2
Cap, veh/h	0	0	297	216	0	297	278	651	68	154	565	520
Arrive On Green	0.00	0.00	0.19	0.19	0.00	0.19	0.16	0.40	0.40	0.09	0.33	0.33
Sat Flow, veh/h	0	0	1585	381	0	1585	1753	1626	169	1781	1722	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	381	0	1585	1753	0	1795	1781	1722	1585
Q Serve(g_s), s	0.0	0.0	6.3	1.2	0.0	1.4	6.1	0.0	13.6	2.4	12.2	0.3
Cycle Q Clear(g_c), s	0.0	0.0	6.3	7.5	0.0	1.4	6.1	0.0	13.6	2.4	12.2	0.3
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	297	216	0	297	278	0	719	154	565	520
V/C Ratio(X)	0.00	0.00	0.72	0.13	0.00	0.18	0.81	0.00	0.78	0.59	0.82	0.03
Avail Cap(c_a), veh/h	0	0	310	233	0	319	353	0	940	215	901	830
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	19.0	22.5	0.0	17.0	20.2	0.0	13.0	21.8	15.3	11.3
Incr Delay (d2), s/veh	0.0	0.0	7.4	0.3	0.0	0.3	10.3	0.0	3.2	3.6	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	2.7	0.3	0.0	0.5	2.9	0.0	4.5	1.0	4.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	26.4	22.7	0.0	17.2	30.5	0.0	16.2	25.4	18.5	11.3
LnGrp LOS	A	A	C	C	A	B	C	A	B	C	B	B
Approach Vol, veh/h		213			81			786			567	
Approach Delay, s/veh		26.4			19.2			20.3			19.5	
Approach LOS		C			B			C			B	

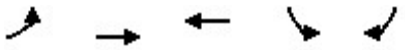
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.4	25.6		14.7	13.0	22.0		14.7				
Change Period (Y+Rc), s	5.1	5.7		5.4	5.1	5.7		* 5.4				
Max Green Setting (Gmax), s	6.0	26.0		9.7	10.0	26.0		* 10				
Max Q Clear Time (g_c+I1), s	4.4	15.6		8.3	8.1	14.2		9.5				
Green Ext Time (p_c), s	0.0	2.4		0.2	0.1	2.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		20.7
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

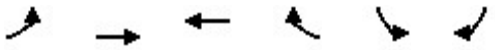
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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	24.2	26.1	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	9.6	24.2	26.1	4.9
Queue Length 50th (ft)	31	41	116	115	0
Queue Length 95th (ft)	#95	83	#274	205	31
Internal Link Dist (ft)		1597	2083	2110	
Turn Bay Length (ft)	120			100	
Base Capacity (vph)	182	1182	828	736	728
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.



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	1856	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	3	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.



Lane Group	EBT	EBR	WBL	WBT	NBL
Lane Group Flow (vph)	379	150	15	500	352
v/c Ratio	0.57	0.22	0.05	0.65	0.60
Control Delay	15.7	3.9	22.8	14.2	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	3.9	22.8	14.2	17.9
Queue Length 50th (ft)	58	0	3	82	61
Queue Length 95th (ft)	176	24	19	167	155
Internal Link Dist (ft)	1867			481	560
Turn Bay Length (ft)		175	100		
Base Capacity (vph)	960	896	273	1425	989
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	0.17	0.05	0.35	0.36

Intersection Summary



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	1722	1752	1870	1796	1870	1767
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, %	12	10	2	7	2	9
Cap, veh/h	546	471	41	850	396	60
Arrive On Green	0.32	0.32	0.02	0.47	0.26	0.26
Sat Flow, veh/h	1722	1485	1781	1796	1520	228
Grp Volume(v), veh/h	379	150	15	500	353	0
Grp Sat Flow(s),veh/h/ln	1722	1485	1781	1796	1753	0
Q Serve(g_s), s	6.8	2.7	0.3	7.2	6.6	0.0
Cycle Q Clear(g_c), s	6.8	2.7	0.3	7.2	6.6	0.0
Prop In Lane		1.00	1.00		0.87	0.13
Lane Grp Cap(c), veh/h	546	471	41	850	457	0
V/C Ratio(X)	0.69	0.32	0.36	0.59	0.77	0.00
Avail Cap(c_a), veh/h	1072	924	302	1128	1091	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	10.6	9.2	17.0	6.8	12.1	0.0
Incr Delay (d2), s/veh	1.6	0.4	5.2	0.7	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	2.1	0.7	0.2	1.8	2.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.2	9.6	22.2	7.4	14.9	0.0
LnGrp LOS	B	A	C	A	B	A
Approach Vol, veh/h	529			515	353	
Approach Delay, s/veh	11.4			7.9	14.9	
Approach LOS	B			A	B	

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	13.9	5.5	15.9	21.4
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	9.2
Green Ext Time (p_c), s	0.9	0.0	2.4	2.7

Intersection Summary	
HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B

Notes

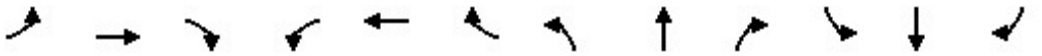
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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



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(I)	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.



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.



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(I)	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+I1), 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 Flows Total veh/h	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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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.



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(I)	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+I1), 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 Flows Total veh/h	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.



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

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(I)	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				

Intersection Summary			
HCM 6th Ctrl Delay		15.9	
HCM 6th LOS		B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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



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(I)	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

Intersection Summary		
HCM 6th Ctrl Delay		12.2
HCM 6th LOS		B

Notes

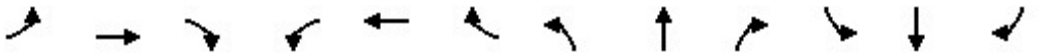
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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.



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(I)	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.



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.



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 Flows Total veh/h	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	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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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.



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(I)	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 Flows Total veh/h	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	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

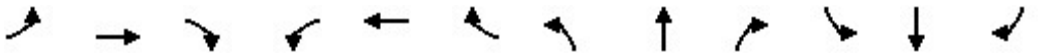
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if 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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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



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(I)	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				

Intersection Summary			
HCM 6th Ctrl Delay		15.9	
HCM 6th LOS		B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



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



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(I)	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	299			842	853	
Approach Delay, s/veh	17.1			10.3	11.9	
Approach LOS	B			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+I1), 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.



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.

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(I)	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.



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.



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 Flows Total veh/h	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	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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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.



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(I)	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
To SR 49
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	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	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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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:

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April 26, 2022

QUEUES – CUMULATIVE SCENARIOS

CUMULATIVE

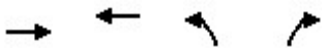
CUMULATIVE PLUS PROJECT – CENTENNIAL

CUMULATIVE PLUS PROJECT – SR 49

KDA

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

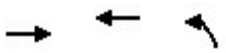
Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	160	132	34	100	24
Average Queue (ft)	71	58	11	52	2
95th Queue (ft)	122	100	35	85	13
Link Distance (ft)	1196	1196		264	401
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				1	
Queuing Penalty (veh)				0	



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.



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



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

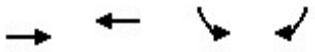
Intersection Summary

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



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



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



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)	67	120	122	142	6	144	114	105	138	122
Average Queue (ft)	25	53	57	56	0	63	42	37	75	51
95th Queue (ft)	53	98	101	116	6	114	81	82	122	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		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)	158	169	102	169	163	61	106	203	222	97	91
Average Queue (ft)	58	84	61	56	80	19	47	96	133	30	40
95th Queue (ft)	126	154	99	129	151	51	85	180	199	74	69
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	1	2	3	4						
Queuing Penalty (veh)	0	2	0	8	11						
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)	157	144	172	157	213	245	396
Average Queue (ft)	49	45	35	38	150	157	95
95th Queue (ft)	122	113	108	110	223	252	306
Link Distance (ft)	456	456	327	327	138	138	890
Upstream Blk Time (%)					20	19	
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)	80	97	169	160	144	127	201	246	92	151	91	81
Average Queue (ft)	33	51	82	90	72	60	93	133	21	75	36	32
95th Queue (ft)	69	86	143	144	120	105	165	219	60	125	76	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	2					
Queuing Penalty (veh)						1	3					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	76
Average Queue (ft)	33
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)	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

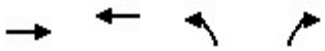
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	191	97	109	127	134	113	91
Average Queue (ft)	89	29	49	57	55	53	45
95th Queue (ft)	159	64	91	109	111	95	77
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay 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

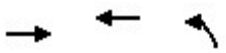
Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	236	197	47	98	37
Average Queue (ft)	108	86	15	48	7
95th Queue (ft)	190	160	42	78	26
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	



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.



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.



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

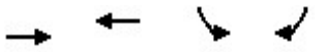
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



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.



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.



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

Intersection Summary

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)	51	146	135	169	39	259	140	232	254	165
Average Queue (ft)	18	57	58	90	3	109	80	84	131	62
95th Queue (ft)	47	103	102	162	21	212	146	186	217	121
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 (%)						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	190	103	181	184	96	206	210	222	124	103
Average Queue (ft)	107	145	66	68	105	25	92	117	141	37	45
95th Queue (ft)	192	213	106	156	189	68	161	194	206	92	81
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	10	3	4	8						
Queuing Penalty (veh)	5	36	0	14	31						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			3	4		0	8	0	0		
Queuing Penalty (veh)			8	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)	148	150	268	361	309	223	236	414
Average Queue (ft)	61	62	80	108	18	141	186	121
95th Queue (ft)	125	127	200	265	144	224	258	357
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)			0	0	0	11	32	
Queuing Penalty (veh)			0	1	2	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)	172	192	251	241	249	208	390	461	340	894	340	130
Average Queue (ft)	70	87	129	134	125	114	159	248	221	366	183	61
95th Queue (ft)	131	152	211	212	217	191	295	397	372	742	369	112
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	0	0	0	0	9	11		0	17	0	
Queuing Penalty (veh)	0	0	1	1	1	26	19		2	97	1	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	147
Average Queue (ft)	68
95th Queue (ft)	123
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)	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

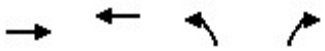
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	537	180	233	133	137	190	71
Average Queue (ft)	228	128	171	44	41	94	34
95th Queue (ft)	472	224	258	102	106	163	59
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			5	0	0		
Queuing Penalty (veh)			16	0	0		
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	13	1					
Queuing Penalty (veh)	49	7					

Zone Summary

Zone wide Queuing Penalty: 462

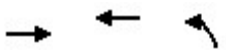
Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

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)					



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

Intersection Summary



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



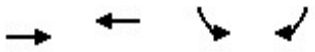
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	56	56	134	97	115	255	14	298
v/c Ratio	0.18	0.11	0.32	0.18	0.29	0.31	0.05	0.32
Control Delay	12.2	1.2	24.6	0.7	24.8	14.4	27.7	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	1.2	24.6	0.7	24.8	14.4	27.7	21.4
Queue Length 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



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



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

Intersection Summary



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

Intersection Summary

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)	40	55	57	71	28	64	56	50	77	63
Average Queue (ft)	11	18	18	23	2	27	17	8	36	14
95th Queue (ft)	35	43	44	52	15	58	44	33	67	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)	58	88	81	74	99	35	30	143	161	57	68
Average Queue (ft)	10	22	29	12	25	5	10	43	87	13	19
95th Queue (ft)	37	60	66	46	72	23	32	107	144	42	49
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)	46	36	22	37	172	149	21
Average Queue (ft)	4	4	1	2	81	70	1
95th Queue (ft)	23	20	10	18	147	115	15
Link Distance (ft)	456	456	327	327	138	138	890
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)	39	62	90	116	64	59	89	118	35	70	54	42
Average Queue (ft)	13	29	26	51	23	22	36	53	3	30	15	12
95th Queue (ft)	39	57	72	96	53	49	75	102	18	60	39	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)	31
Average Queue (ft)	7
95th Queue (ft)	27
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

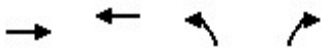
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	100	51	88	80	72	49	65
Average Queue (ft)	37	17	36	27	16	15	30
95th Queue (ft)	80	41	73	64	53	43	53
Link Distance (ft)	1539		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (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

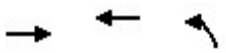
Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	205	137	42	83	43
Average Queue (ft)	91	66	15	40	7
95th Queue (ft)	153	114	41	66	28
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	



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.



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.



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

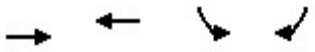
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



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.



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.



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)	48	112	119	169	28	265	140	189	212	166
Average Queue (ft)	18	54	57	82	3	106	73	75	114	62
95th Queue (ft)	45	101	104	149	16	223	133	154	180	121
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	1						
Queuing Penalty (veh)		1	1	2						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						5	1			
Queuing Penalty (veh)						10	4			

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)	178	186	102	184	181	113	159	142	166	86	106
Average Queue (ft)	101	125	70	77	94	31	72	57	94	22	48
95th Queue (ft)	179	199	108	170	176	76	122	121	150	60	84
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	4	3	5	6						
Queuing Penalty (veh)	4	15	0	20	23						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			3	5		0	2				
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)	184	220	286	338	323	222	233	575
Average Queue (ft)	83	93	82	107	21	142	180	147
95th Queue (ft)	163	177	206	252	151	223	261	479
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)			0	0	0	12	30	0
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)	162	181	222	229	261	201	335	405	339	515	334	143
Average Queue (ft)	65	87	124	126	126	103	147	227	188	273	149	56
95th Queue (ft)	124	147	198	200	215	170	263	352	338	467	306	113
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	0	6	9		0	9	0	
Queuing Penalty (veh)		0	0	1	1	18	15		2	51	1	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	127
Average Queue (ft)	56
95th Queue (ft)	106
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

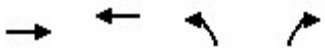
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	534	180	238	125	124	198	81
Average Queue (ft)	216	126	171	45	41	96	36
95th Queue (ft)	421	218	253	104	101	165	63
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			4				
Queuing Penalty (veh)			12				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	12	1					
Queuing Penalty (veh)	42	6					

Zone Summary

Zone wide Queuing Penalty: 276

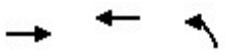
Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	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)					



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

Intersection Summary



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



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

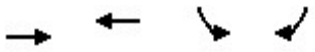
Intersection Summary

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



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

Intersection Summary



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

Intersection Summary



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

Intersection Summary

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)	59	68	81	108	19	122	84	85	115	81
Average Queue (ft)	21	26	36	36	1	50	34	25	62	31
95th Queue (ft)	51	54	67	79	7	95	65	63	102	65
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)	152	163	101	117	125	71	118	159	177	67	57
Average Queue (ft)	38	68	50	30	45	19	51	42	87	19	29
95th Queue (ft)	104	133	92	87	104	53	91	105	144	54	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	2						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	1			1				
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)	73	73	55	65	201	123	76
Average Queue (ft)	14	20	5	7	105	55	4
95th Queue (ft)	46	58	28	36	173	95	39
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	86	107	116	132	77	128	149	115	176	108	58
Average Queue (ft)	19	36	45	51	60	41	46	64	30	87	42	21
95th Queue (ft)	53	70	89	89	104	74	97	121	78	146	85	51
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)	61
Average Queue (ft)	27
95th Queue (ft)	56
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

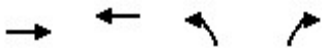
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	99	50	127	64	62	75	57
Average Queue (ft)	42	18	62	26	14	35	26
95th Queue (ft)	83	40	108	58	46	64	49
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay 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

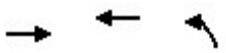
Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	140	140	33	100	24
Average Queue (ft)	71	57	11	50	1
95th Queue (ft)	117	98	35	81	9
Link Distance (ft)	1196	1196		263	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	



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.



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



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

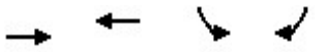
Intersection Summary

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



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



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



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	SB	SB	SB
Directions Served	LTR	L	LT	R	T	R	L	L	T
Maximum Queue (ft)	65	122	127	146	135	98	116	137	124
Average Queue (ft)	26	54	61	54	63	42	36	75	56
95th Queue (ft)	55	98	110	109	113	78	85	122	103
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)	146	174	103	176	160	57	95	199	217	73	82
Average Queue (ft)	60	83	58	60	80	18	45	107	135	28	40
95th Queue (ft)	126	158	100	137	154	47	78	184	198	63	69
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	1	1	3	3						
Queuing Penalty (veh)	0	2	0	8	11						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	3			0	0	0		
Queuing Penalty (veh)			3	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)	149	138	141	144	211	238	473
Average Queue (ft)	46	42	33	37	148	157	98
95th Queue (ft)	113	107	101	108	221	246	327
Link Distance (ft)	456	456	327	327	138	138	890
Upstream Blk Time (%)					18	19	
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	118	171	177	164	117	189	241	77	138	102	68
Average Queue (ft)	35	57	84	96	77	59	88	124	22	74	39	32
95th Queue (ft)	70	95	148	151	130	102	154	204	59	125	77	63
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	2					
Queuing Penalty (veh)						1	3					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	87
Average Queue (ft)	31
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)	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

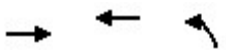
Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	217	179	37	99	46
Average Queue (ft)	106	84	13	50	8
95th Queue (ft)	182	149	38	83	29
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	



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.



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.



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

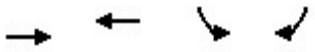
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



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.



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.



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

Intersection Summary

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)	54	123	127	180	42	290	140	223	236	165
Average Queue (ft)	18	58	58	100	4	110	84	82	124	67
95th Queue (ft)	46	102	102	178	25	216	150	173	197	131
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)		0	0	1						
Queuing Penalty (veh)		0	0	4						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						6	2			
Queuing Penalty (veh)						12	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)	177	198	102	176	184	118	197	224	226	97	113
Average Queue (ft)	100	140	62	62	113	29	91	117	143	35	49
95th Queue (ft)	187	212	104	146	195	74	157	202	206	78	92
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	8	2	4	10						
Queuing Penalty (veh)	4	28	0	16	38						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	4		0	9	0	0		
Queuing Penalty (veh)			8	5		0	3	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)	164	151	265	324	212	216	247	637
Average Queue (ft)	67	71	79	104	13	141	189	238
95th Queue (ft)	134	132	199	255	110	226	261	710
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)			0	0	0	13	37	3
Queuing Penalty (veh)			0	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)	163	181	267	279	279	209	418	516	339	735	340	143
Average Queue (ft)	70	90	136	135	139	120	183	271	228	351	195	65
95th Queue (ft)	133	154	219	214	233	205	326	413	386	640	383	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	0	1	11	14		0	18	1	
Queuing Penalty (veh)	0	0	1	2	2	34	24		3	104	3	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	149
Average Queue (ft)	70
95th Queue (ft)	126
Link Distance (ft)	229
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
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

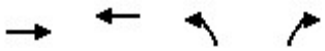
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	558	180	231	120	130	200	73
Average Queue (ft)	233	122	165	48	47	99	33
95th Queue (ft)	476	221	254	104	108	167	60
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			5		0		
Queuing Penalty (veh)			14		0		
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	13	2					
Queuing Penalty (veh)	47	8					

Zone Summary

Zone wide Queuing Penalty: 484

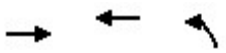
Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

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)					



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



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

Intersection Summary



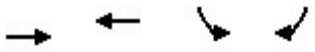
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	160	134	97	149	274	14	327
v/c Ratio	0.02	0.32	0.35	0.19	0.38	0.25	0.06	0.39
Control Delay	24.8	4.3	22.1	0.8	22.1	10.6	24.5	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	4.3	22.1	0.8	22.1	10.6	24.5	19.0
Queue Length 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



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



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



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

Intersection Summary

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)	43	55	52	75	28	73	64	48	83	59
Average Queue (ft)	12	19	19	24	3	25	16	7	35	14
95th Queue (ft)	38	43	44	56	17	58	46	29	65	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)	39	86	71	80	99	45	30	142	163	56	44
Average Queue (ft)	8	24	26	12	25	7	8	44	88	13	21
95th Queue (ft)	29	65	58	45	70	29	29	111	148	42	44
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)	46	44	46	46	184	142	25
Average Queue (ft)	6	4	3	4	83	71	2
95th Queue (ft)	26	22	20	25	151	117	21
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	65	90	110	61	54	102	131	35	83	48	41
Average Queue (ft)	12	30	24	46	21	22	37	51	4	29	14	12
95th Queue (ft)	39	58	70	91	51	47	81	101	21	61	33	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)	34
Average Queue (ft)	4
95th Queue (ft)	21
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

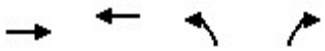
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	96	60	92	84	76	49	63
Average Queue (ft)	35	19	35	27	18	15	30
95th Queue (ft)	75	44	74	64	56	42	52
Link Distance (ft)	1539		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (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

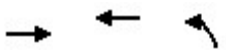
Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	183	134	38	79	40
Average Queue (ft)	89	62	15	39	7
95th Queue (ft)	147	105	40	64	26
Link Distance (ft)	1196	1196		263	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	



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.



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	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

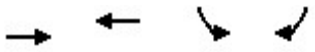
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



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.



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.



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)	54	116	113	165	41	236	140	171	198	159
Average Queue (ft)	20	51	56	87	3	101	73	71	110	65
95th Queue (ft)	47	92	98	152	21	183	135	143	175	125
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 (%)						5	1			
Queuing Penalty (veh)						10	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)	171	186	102	183	179	87	139	147	161	81	104
Average Queue (ft)	101	121	65	71	92	29	69	54	95	26	50
95th Queue (ft)	182	201	105	159	178	71	118	112	149	66	86
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	3	2	5	6						
Queuing Penalty (veh)	4	12	0	21	25						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	5		0	3				
Queuing Penalty (veh)			8	7		1	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)	188	232	228	302	180	213	227	434
Average Queue (ft)	82	85	70	99	15	139	171	120
95th Queue (ft)	168	179	179	244	121	224	254	443
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	12	28	1
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)	151	160	242	244	281	201	386	459	339	615	340	130
Average Queue (ft)	68	87	129	138	127	106	151	240	193	291	147	56
95th Queue (ft)	125	137	212	215	222	182	284	388	351	511	318	101
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	0	1	7	9		0	11	0	
Queuing Penalty (veh)	0	0	1	2	2	21	16		2	61	0	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	134
Average Queue (ft)	62
95th Queue (ft)	117
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)	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

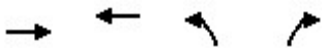
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	420	180	233	143	153	192	82
Average Queue (ft)	193	124	169	45	41	95	36
95th Queue (ft)	346	217	250	105	104	162	64
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			4				
Queuing Penalty (veh)			11				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	10	1					
Queuing Penalty (veh)	34	6					

Zone Summary

Zone wide Queuing Penalty: 311

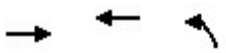
Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

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)					



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

Intersection Summary



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



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



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



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

Intersection Summary

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)	52	64	84	115	18	101	78	91	126	91
Average Queue (ft)	20	26	37	37	1	48	34	25	64	32
95th Queue (ft)	46	53	69	82	9	86	61	65	106	68
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)	135	162	98	151	139	61	89	141	161	52	63
Average Queue (ft)	36	68	56	36	51	21	46	42	85	15	28
95th Queue (ft)	96	139	95	104	117	52	76	101	139	42	51
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	0	1	1	1						
Queuing Penalty (veh)	0	0	0	3	3						
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)	72	91	65	80	194	138	50
Average Queue (ft)	13	22	7	10	109	58	3
95th Queue (ft)	46	60	33	45	179	103	31
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)	66	84	101	113	140	95	120	133	132	190	103	74
Average Queue (ft)	16	37	42	52	63	41	45	64	31	89	40	25
95th Queue (ft)	47	69	84	91	114	77	91	113	78	150	82	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	0					
Queuing Penalty (veh)					0	0	0					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	71
Average Queue (ft)	30
95th Queue (ft)	62
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

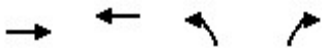
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	90	55	138	64	60	72	60
Average Queue (ft)	41	19	61	25	12	35	27
95th Queue (ft)	78	42	111	55	43	67	49
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay 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

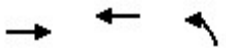
Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	131	127	34	99	21
Average Queue (ft)	70	56	11	50	1
95th Queue (ft)	114	93	35	80	10
Link Distance (ft)	1196	1196		264	401
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	



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.



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



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

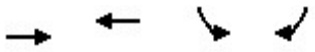
Intersection Summary

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



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



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



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)	62	132	138	141	6	129	106	120	164	131
Average Queue (ft)	28	53	59	54	0	62	42	38	80	54
95th Queue (ft)	55	102	110	109	4	106	77	91	137	105
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 (%)						0	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	178	102	158	156	56	104	188	218	135	85
Average Queue (ft)	64	86	58	58	75	17	48	102	134	32	41
95th Queue (ft)	137	165	102	133	145	46	82	180	198	113	70
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	1	1	2	3						
Queuing Penalty (veh)	1	3	0	8	10						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			1	2			0	0	0		
Queuing Penalty (veh)			3	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)	140	165	161	168	39	214	244	342
Average Queue (ft)	47	48	34	38	1	144	155	73
95th Queue (ft)	115	119	106	116	36	219	243	246
Link Distance (ft)	456	456	327	327	327	138	138	890
Upstream Blk Time (%)					0	17	19	
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)	82	98	197	194	168	135	198	228	80	165	97	77
Average Queue (ft)	34	51	89	101	75	58	95	130	22	73	39	33
95th Queue (ft)	69	83	160	163	132	104	169	205	55	128	75	69
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	3					
Queuing Penalty (veh)			0			0	4					

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	86
Average Queue (ft)	34
95th Queue (ft)	69
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

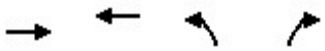
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	208	130	132	127	130	121	96
Average Queue (ft)	95	28	54	56	53	57	44
95th Queue (ft)	167	72	104	108	109	103	76
Link Distance (ft)	548		211	211	211	1120	1120
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage 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

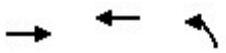
Movement	WB	WB	NB	NB	SB
Directions Served	LT	TR	L	T	TR
Maximum Queue (ft)	211	180	37	99	50
Average Queue (ft)	107	84	13	51	8
95th Queue (ft)	179	149	38	84	30
Link Distance (ft)	1196	1196		264	402
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			100		
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	



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.



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.



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

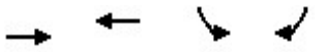
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



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.



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.



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

Intersection Summary

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)	59	123	117	174	40	236	140	229	285	147
Average Queue (ft)	19	58	60	97	3	112	79	87	130	63
95th Queue (ft)	48	103	102	166	22	200	144	179	212	120
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)				1						
Queuing Penalty (veh)				2						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						7	2		0	
Queuing Penalty (veh)						15	6		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)	186	197	101	172	184	117	223	218	230	155	111
Average Queue (ft)	108	145	62	60	109	37	97	109	136	37	46
95th Queue (ft)	193	217	102	143	187	86	187	190	202	98	83
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	2	8	2	3	9						
Queuing Penalty (veh)	9	31	0	13	33						
Storage Bay Dist (ft)			140			100		240	240		240
Storage Blk Time (%)			2	3		1	9	0	0		
Queuing Penalty (veh)			5	4		1	3	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)	152	177	246	313	232	218	238	448
Average Queue (ft)	61	68	79	102	14	136	182	115
95th Queue (ft)	131	136	195	249	124	220	258	400
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	10	32	0
Queuing Penalty (veh)				1	2	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)	156	178	250	255	279	202	345	430	339	662	340	150
Average Queue (ft)	73	92	127	136	129	113	161	251	207	300	168	65
95th Queue (ft)	131	150	206	218	225	192	285	382	353	546	334	119
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	0	0	1	8	12		0	11	0	
Queuing Penalty (veh)		0	1	2	2	26	20		1	62	0	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	140
Average Queue (ft)	65
95th Queue (ft)	118
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)	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

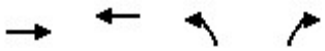
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	611	180	238	115	123	199	72
Average Queue (ft)	255	136	174	45	43	101	35
95th Queue (ft)	537	225	259	99	101	168	61
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			5				
Queuing Penalty (veh)			14				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	16	1					
Queuing Penalty (veh)	59	6					

Zone Summary

Zone wide Queuing Penalty: 460

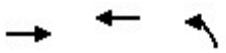
Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

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)				



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



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

Intersection Summary



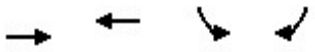
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	160	134	97	149	283	14	335
v/c Ratio	0.02	0.32	0.35	0.19	0.38	0.26	0.06	0.40
Control Delay	24.8	4.3	22.2	0.8	22.2	10.7	24.6	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	4.3	22.2	0.8	22.2	10.7	24.6	19.0
Queue Length 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

Intersection Summary



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



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



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

Intersection Summary

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)	40	59	53	78	31	61	55	51	83	49
Average Queue (ft)	10	20	19	28	4	25	17	8	41	14
95th Queue (ft)	34	46	44	58	19	54	45	31	73	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)	57	88	73	68	100	33	33	143	168	57	51
Average Queue (ft)	10	25	27	12	28	6	8	47	93	14	20
95th Queue (ft)	37	68	60	42	75	25	28	109	151	42	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)	34	40	29	26	167	140	4
Average Queue (ft)	2	4	1	2	78	60	0
95th Queue (ft)	15	18	12	12	137	103	3
Link Distance (ft)	456	456	327	327	138	138	890
Upstream Blk Time (%)					1	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)	44	68	76	93	59	64	92	129	27	69	44	44
Average Queue (ft)	11	30	18	42	21	21	33	51	4	27	15	12
95th Queue (ft)	36	57	57	83	50	50	68	101	19	55	34	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)	31
Average Queue (ft)	4
95th Queue (ft)	20
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

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

To SR 49



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

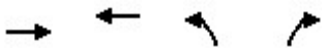
Intersection Summary

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



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

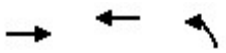
Intersection Summary



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.



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

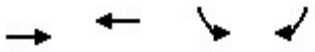
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



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.



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.



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)	52	116	117	171	28	236	140	166	203	137
Average Queue (ft)	21	54	56	95	3	100	74	68	111	61
95th Queue (ft)	48	96	100	168	17	182	136	141	173	117
Link Distance (ft)	777	160	160	160		1486				1622
Upstream Blk Time (%)			0	1						
Queuing Penalty (veh)			0	2						
Storage Bay Dist (ft)					115		115	360	360	
Storage Blk Time (%)						5	1			
Queuing Penalty (veh)						10	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)	169	191	102	186	190	83	145	156	179	67	104
Average Queue (ft)	98	123	67	69	99	30	71	55	97	22	47
95th Queue (ft)	178	204	108	156	191	69	121	124	158	55	82
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	1	5	3	5	7						
Queuing Penalty (veh)	3	17	0	19	29						
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)	225	226	263	311	231	222	244	512
Average Queue (ft)	83	96	75	99	11	145	181	158
95th Queue (ft)	173	191	194	238	101	230	263	487
Link Distance (ft)	456	456	334	334	334	145	145	915
Upstream Blk Time (%)				0	0	14	33	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)	136	156	250	245	259	189	297	411	339	637	340	139
Average Queue (ft)	66	83	133	134	129	106	147	238	196	296	157	63
95th Queue (ft)	121	134	219	216	224	180	255	361	345	507	328	116
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	8	12		0	11	0	
Queuing Penalty (veh)			1	1	1	23	19		1	61	1	

Intersection: 11: Sutton Way & Brunswick Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	128
Average Queue (ft)	62
95th Queue (ft)	112
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

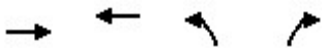
Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	R	L	T	T	LT	R
Maximum Queue (ft)	475	180	236	142	132	188	72
Average Queue (ft)	211	124	165	45	42	95	34
95th Queue (ft)	394	220	249	105	103	161	59
Link Distance (ft)	1398		211	211	211	1120	1120
Upstream Blk Time (%)			4				
Queuing Penalty (veh)			11				
Storage Bay Dist (ft)		155					
Storage Blk Time (%)	12	2					
Queuing Penalty (veh)	44	8					

Zone Summary

Zone wide Queuing Penalty: 344

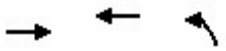
Intersection: 3: E. Bennett St & Tinloy St/SR 49 WB Off-Ramp

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)					



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

Intersection Summary



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



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

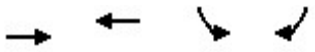
Intersection Summary

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

Intersection Summary



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



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

Intersection Summary

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)	54	70	87	107	22	141	97	102	147	87
Average Queue (ft)	21	26	37	39	1	53	35	26	67	31
95th Queue (ft)	49	54	71	81	9	101	68	71	116	67
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)	146	178	101	127	136	63	102	152	169	62	59
Average Queue (ft)	40	72	55	34	45	20	46	41	87	16	28
95th Queue (ft)	101	147	94	98	109	52	78	109	147	46	52
Link Distance (ft)	160	160		103	103		1666			1351	
Upstream Blk Time (%)	0	1	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)			2	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)	76	108	62	61	6	203	125	58
Average Queue (ft)	15	23	7	9	0	110	56	3
95th Queue (ft)	51	67	33	37	5	179	98	28
Link Distance (ft)	456	456	334	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)	66	87	94	117	126	104	103	178	96	160	118	64
Average Queue (ft)	18	35	46	55	57	39	45	70	30	86	42	22
95th Queue (ft)	52	69	88	97	99	77	86	128	71	140	86	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)	97
Average Queue (ft)	31
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)	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

LOS APPENDICES

FOR

IDAHO - MARYLAND MINE PROJECT
TRAFFIC IMPACT ANALYSIS

Nevada County, CA

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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 26, 2022

ROADWAY LEVEL OF SERVICE

EPAP PLUS PROJECT – CENTENNIAL

EPAP PLUS PROJECT – SR 49

CUMULATIVE

CUMULATIVE PLUS PROJECT – CENTENNIAL

CUMULATIVE PLUS PROJECT – SR 49

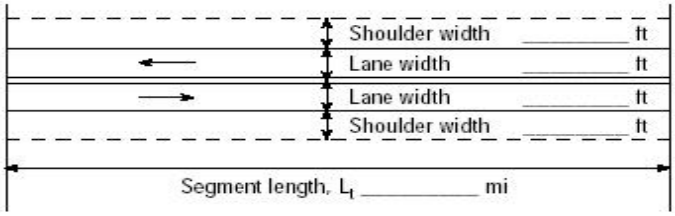
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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 *532*veh/h

Opposing direction vol., V_o *549*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*642*	*662*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*624*	*636*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

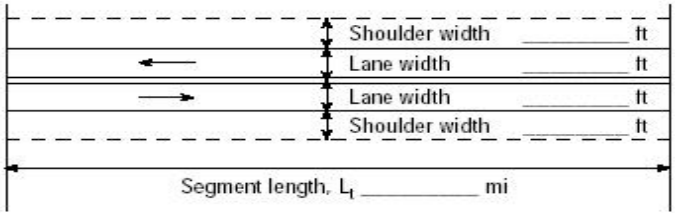
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*PM Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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 *549*veh/h

Opposing direction vol., V_o *532*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*662*	*642*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*1.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.7 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*43.5 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*31.7 mi/h*
		Percent free flow speed, PFFS	*72.9 %*

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*	*1.2*
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*	*0.988*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*636*	*624*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*59.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*32.6*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*76.3*	

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	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

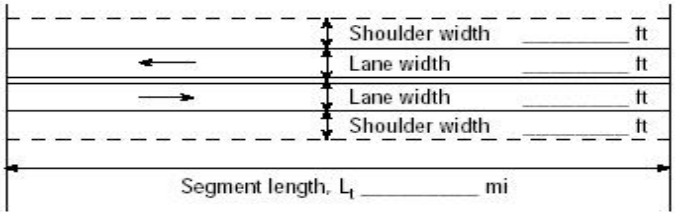
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



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 *404*veh/h

Opposing direction vol., V_o *651*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)	*1.9*	*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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.93*	*0.98*
Demand flow rate[2], 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[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.94*	*0.99*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*506*	*747*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*459.1*
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)	*4.65*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

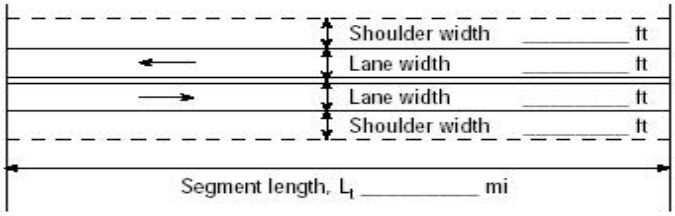
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*PM Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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 *651*veh/h

Opposing direction vol., V_o *404*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)	*1.5*	*1.9*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.957*	*0.925*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.93*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*789*	*534*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*1.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.2 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*49.0 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*36.6 mi/h*
		Percent free flow speed, PFFS	*74.7 %*

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*	*1.4*
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*	*0.965*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.99*	*0.94*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*747*	*506*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*64.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.8*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*82.6*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*739.8*
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)	*4.90*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

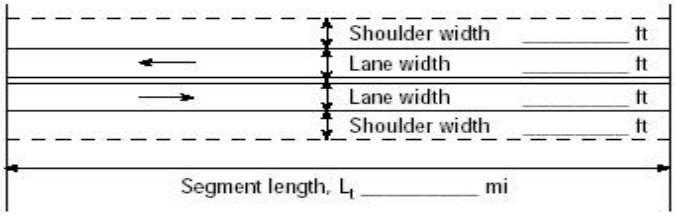
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *62*veh/h

Opposing direction vol., V_o *91*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.1*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.67*	*0.68*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*129*	*186*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.73*	*0.74*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*113*	*163*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*78.5*
Effective width, Wv (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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

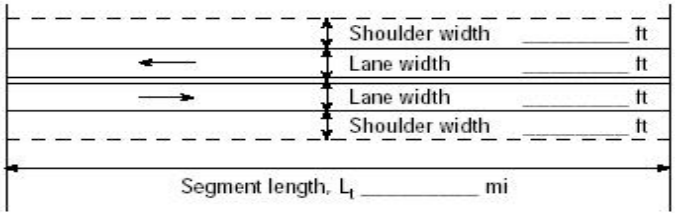
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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		Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *91*veh/h

Opposing direction vol., V_o *62*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.1*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.6*	*2.7*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.911*	*0.906*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.68*	*0.67*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*186*	*129*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.9 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*41.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*36.3 mi/h*
		Percent free flow speed, PFFS	*87.3* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.8*	*1.9*
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*	*0.949*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.74*	*0.73*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*163*	*113*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*18.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*54.7*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*50.3*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*115.2*
Effective width, Wv (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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

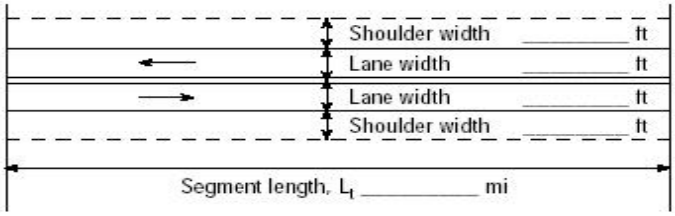
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*10/23/2019*	Jurisdiction	*NV County*
Analysis Time Period		Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



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 *354*veh/h

Opposing direction vol., V_o *525*veh/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)	*5.0*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.807*	*0.994*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.84*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*600*	*607*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*35.7 mi/h*
		Percent free flow speed, PFFS	*76.2 %*

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*407*	*603*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*45.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*36.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*60.4*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*406.9*
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)	*5.43*
Bicycle level of service (Exhibit 15-4)	*E*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

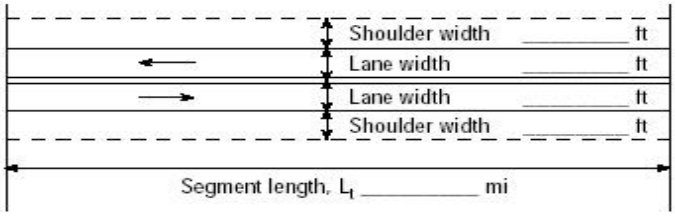
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*PM Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data





☐ 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 *525*veh/h

Opposing direction vol., V_o *354*veh/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*	*5.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.994*	*0.807*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.84*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*607*	*600*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*35.7 mi/h*
		Percent free flow speed, PFFS	*76.1 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*603*	*407*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*55.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*36.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*76.9*	

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	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

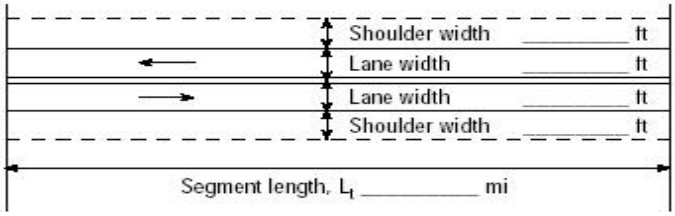
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*PM Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ Class I highway ☐ Class II highway ☑ Class III highway

Terrain ☐ Level ☑ Rolling

Analysis direction vol., V_d	*354*veh/h	Grade Length mi	Up/down
Opposing direction vol., V_o	*526*veh/h	Peak-hour factor, PHF	*0.80*
Shoulder width ft	*2.0*	No-passing zone	*100*%
Lane Width ft	*12.0*	% Trucks and Buses , P_T	*6* %
Segment Length mi	*0.7*	% Recreational vehicles, P_R	*0*%
		Access points *mi*	*10*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.9*	*1.6*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.949*	*0.965*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.92*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*507*	*695*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.5* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.5* *mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*44.9* *mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*34.1* *mi/h*
		Percent free flow speed, PFFS	*75.9* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.4*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.93*	*0.98*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*487*	*671*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*52.5*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*33.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*66.4*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

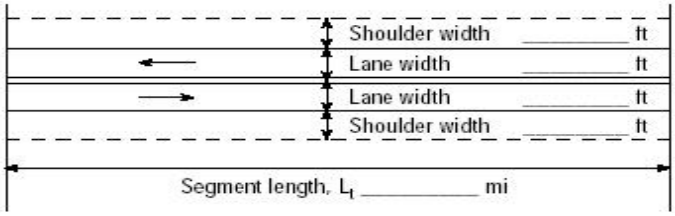
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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%*

Analysis direction vol., V_d *526*veh/h

Opposing direction vol., V_o *354*veh/h

% Trucks and Buses , P_T *6 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *10*/mi

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.92*
Demand flow rate[2], 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[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*0.93*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*671*	*487*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*657.5*
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)	*5.67*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

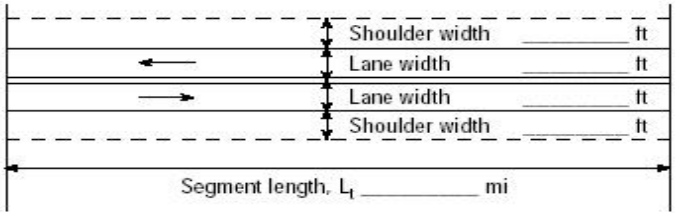
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☑ 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%*

Analysis direction vol., V_d *289*veh/h

Opposing direction vol., V_o *527*veh/h

% Trucks and Buses , P_T *8* %

% Recreational vehicles, P_R *0%*

Access points *mi* *8*/mi

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.86*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*425*	*667*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.87*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*405*	*632*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*336.0*
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)	*6.02*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

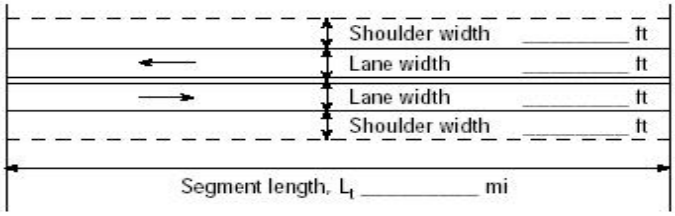
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*10/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☑ 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%*

Analysis direction vol., V_d *527*veh/h

Opposing direction vol., V_o *289*veh/h

% Trucks and Buses , P_T *8* %

% Recreational vehicles, P_R *0%*

Access points *mi* *8*/mi

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)	*1.7*	*2.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.947*	*0.919*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.86*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*667*	*425*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.6 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*29.3 mi/h*
		Percent free flow speed, PFFS	*72.6 %*

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*	*1.6*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*0.87*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*632*	*405*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*56.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*33.3*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*77.2*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*612.8*
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)	*6.33*
Bicycle level of service (Exhibit 15-4)	*F*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

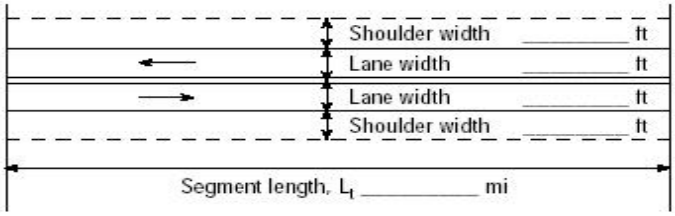
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *548*veh/h

Opposing direction vol., V_o *567*veh/h

Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *1.0*

Show North Arrow

☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*661*	*684*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*0.98*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*635*	*650*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

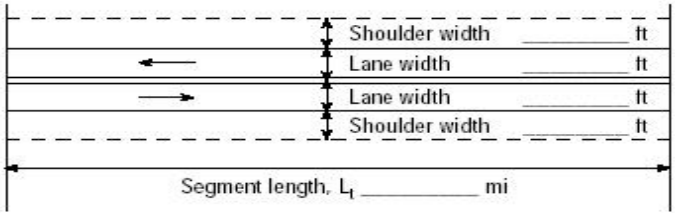
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *567* veh/h

Opposing direction vol., V_o *548* veh/h

Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *1.0*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*684*	*661*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=BFFS-f_{LS}-f_A)	*43.5 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*31.4 mi/h*
		Percent free flow speed, PFFS	*72.3 %*

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*	*1.0*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*650*	*635*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*61.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*31.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*77.1*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*637.1*
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)	*3.76*
Bicycle level of service (Exhibit 15-4)	*D*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

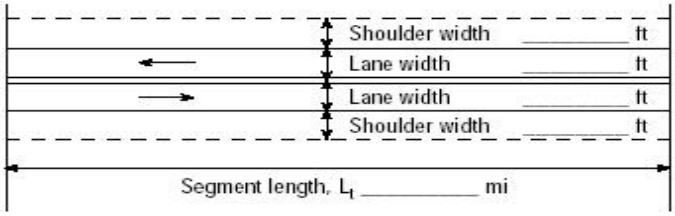
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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 *425*veh/h

Opposing direction vol., V_o *679*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)	*1.8*	*1.5*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.933*	*0.957*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.94*	*0.99*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*551*	*814*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=BFFS-f_{LS}-f_A)	*49.0 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*37.1 mi/h*
		Percent free flow speed, PFFS	*75.8 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.4*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.95*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*527*	*772*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*56.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*28.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*67.7*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*483.0*
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)	*4.68*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	
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. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

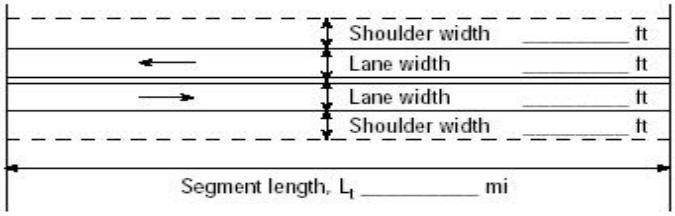
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *679*veh/h

Opposing direction vol., V_o *425*veh/h

Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *0.7*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.5*	*1.8*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.957*	*0.933*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.99*	*0.94*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*814*	*551*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*1.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*49.0 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*36.3 mi/h*
		Percent free flow speed, PFFS	*74.1 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*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*	*0.965*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*0.95*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*772*	*527*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*65.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*28.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*82.9*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

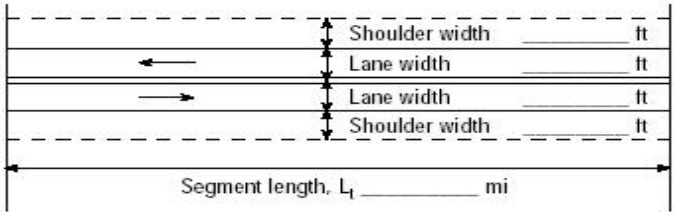
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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 *68*veh/h

Opposing direction vol., V_o *104*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.67*	*0.70*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*142*	*206*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*4.0 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*41.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*35.0 mi/h*
		Percent free flow speed, PFFS	*84.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.9*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.73*	*0.75*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*124*	*184*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*14.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*54.7*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*36.1*	

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	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*86.1*
Effective width, Wv (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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

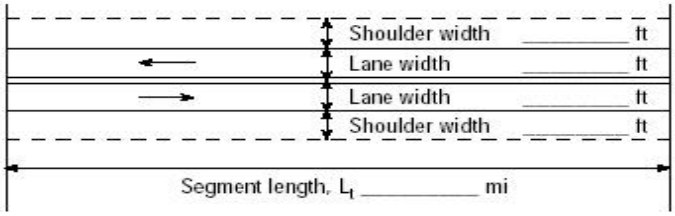
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *104*veh/h

Opposing direction vol., V_o *68*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.1*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.6*	*2.7*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.911*	*0.906*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.70*	*0.67*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*206*	*142*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*41.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*35.9 mi/h*
		Percent free flow speed, PFFS	*86.1* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.8*	*1.9*
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*	*0.949*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.75*	*0.73*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*184*	*124*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*20.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*54.7*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*52.7*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*131.6*
Effective width, Wv (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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

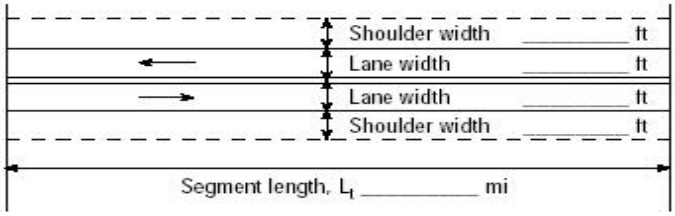
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*10/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*EPAP Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *365*veh/h

Opposing direction vol., V_o *537*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.4*



☐ 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

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, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.809*	*0.994*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.85*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*610*	*621*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*35.6 mi/h*
		Percent free flow speed, PFFS	*75.8* %

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*420*	*617*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*47.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*35.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*61.7*	

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	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*419.5*
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)	*5.45*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

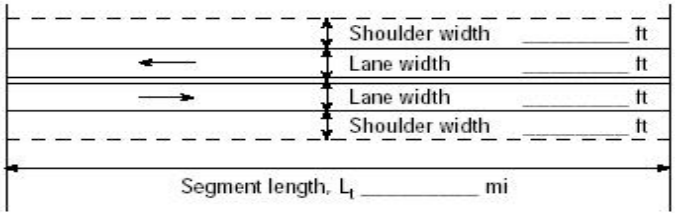
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



☐ 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*%

Analysis direction vol., V_d	*537*veh/h	% Trucks and Buses , P_T	*6* %
Opposing direction vol., V_o	*365*veh/h	% Recreational vehicles, P_R	*0*%
Shoulder width ft	*2.0*	Access points *mi*	*2*/mi
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*	*4.9*
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*	*0.809*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.85*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*621*	*610*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*35.5 mi/h*
		Percent free flow speed, PFFS	*75.8* %

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*617*	*420*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*56.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*35.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*78.1*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*617.2*
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)	*5.64*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

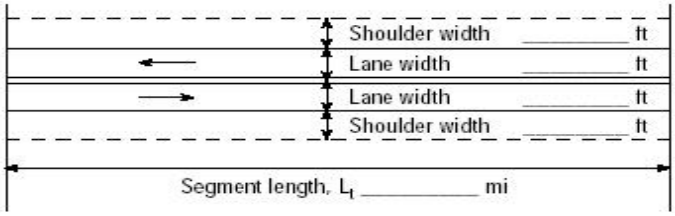
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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

Analysis direction vol., V_d *365*veh/h

Opposing direction vol., V_o *537*veh/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)	*1.9*	*1.6*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.949*	*0.965*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.93*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*517*	*710*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.5 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*44.9 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*33.9 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)	*1.4*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.93*	*0.98*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*502*	*685*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*53.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*32.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*67.4*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*
Notes	
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. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

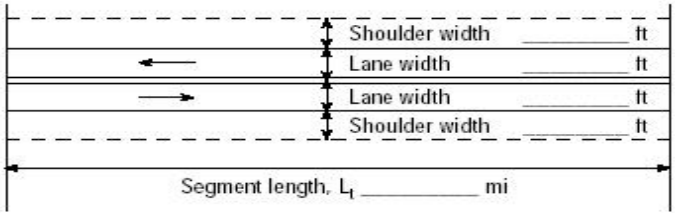
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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

Analysis direction vol., V_d *537*veh/h

Opposing direction vol., V_o *365*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.93*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*710*	*517*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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	*74.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*0.93*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*685*	*502*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*62.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*32.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*80.9*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*671.3*
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)	*5.68*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

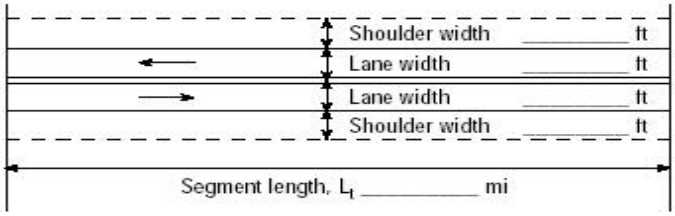
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☑ 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%*

Analysis direction vol., V_d *292*veh/h

Opposing direction vol., V_o *529*veh/h

% Trucks and Buses , P_T *8* %

% Recreational vehicles, P_R *0%*

Access points *mi* *8*/mi

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.86*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*430*	*670*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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	*74.9 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.6*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.87*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*409*	*634*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*46.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*33.2*	
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*	*0.25*

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*339.5*
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)	*6.03*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

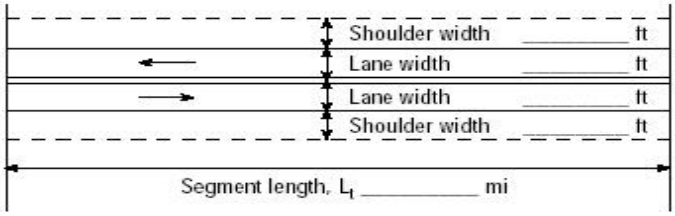
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*10/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*EPAP Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *529*veh/h

Opposing direction vol., V_o *292*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *2.1*



☑ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.7*	*2.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.947*	*0.919*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.86*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*670*	*430*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.6 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*29.3 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*	*1.6*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*0.87*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*634*	*409*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*56.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*33.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*76.9*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

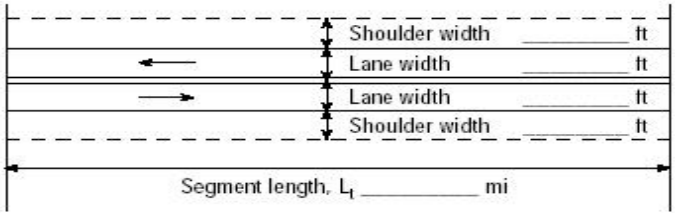
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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 *575*veh/h

Opposing direction vol., V_o *584*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*694*	*694*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*0.98*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*659*	*670*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*646.1*
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

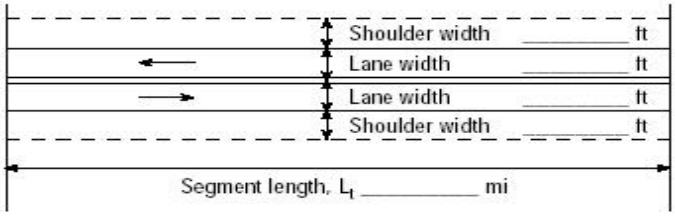
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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*

Input Data



Show North Arrow

☐ 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 *584*veh/h

Opposing direction vol., V_o *575*veh/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*	*1.7*
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*	*0.960*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*694*	*694*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*0.98*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*670*	*659*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*62.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*30.7*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*78.4*	

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*656.2*
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)	*3.77*
Bicycle level of service (Exhibit 15-4)	*D*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

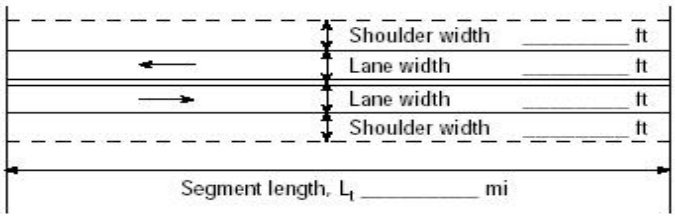
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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*

Input Data



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 *508*veh/h

Opposing direction vol., V_o *736*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)	*1.7*	*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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.99*
Demand flow rate[2], 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[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*606*	*836*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*577.3*
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)	*4.77*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

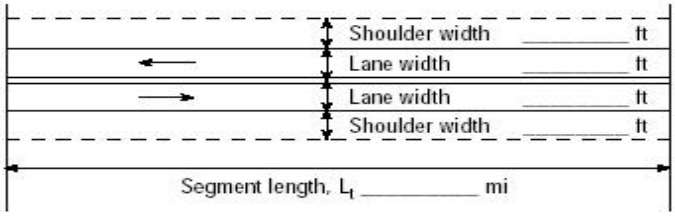
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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%*

Analysis direction vol., V_d *736*veh/h

% Trucks and Buses , P_T *9* %

Opposing direction vol., V_o *508*veh/h

% Recreational vehicles, P_R *0%*

Shoulder width ft *6.0*

Lane Width ft *12.0*

Access points *mi* *4*/mi

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.99*	*0.97*
Demand flow rate[2], 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**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*836*	*606*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

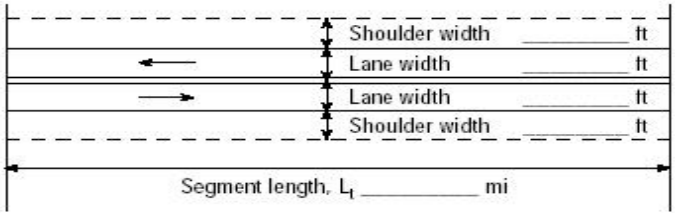
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



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*%

Show North Arrow

Analysis direction vol., V_d	*90*veh/h
Opposing direction vol., V_o	*112*veh/h
Shoulder width ft	*2.0*
Lane Width ft	*12.0*
Segment Length mi	*0.1*
% Trucks and Buses , P_T	*6* %
% Recreational vehicles, P_R	*2*%
Access points *mi*	*3*/mi

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.79*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*158*	*148*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*114*	*143*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

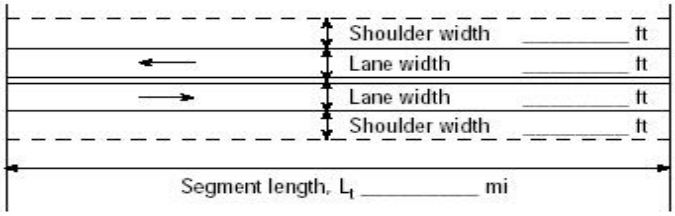
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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*

Input Data



Analysis direction vol., V_d *112*veh/h

Opposing direction vol., V_o *90*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.1*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.70*	*0.68*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*221*	*184*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.76*	*0.74*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*195*	*161*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

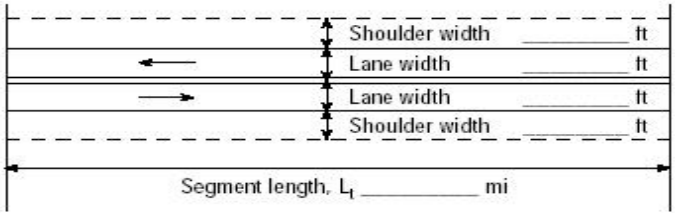
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*10/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*EPAP plus Project Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



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 *450*veh/h

Opposing direction vol., V_o *601*veh/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, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.822*	*0.994*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*649*	*695*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.6* *mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9* *mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*34.9* *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_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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*518*	*691*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*54.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*32.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

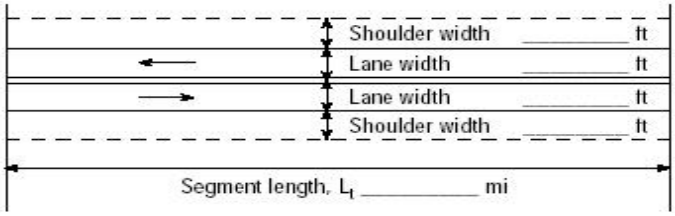
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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*

Input Data



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 *601*veh/h

Opposing direction vol., V_o *450*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*695*	*649*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*691*	*518*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	
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. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

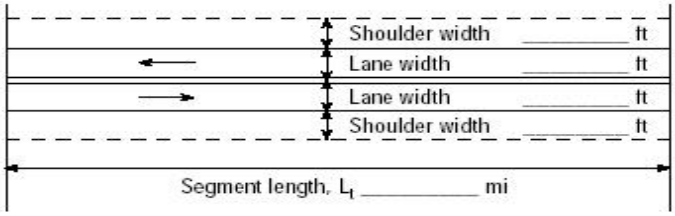
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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*

Input Data



Analysis direction vol., V_d *380*veh/h

Opposing direction vol., V_o *559*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.7*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.94*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*530*	*739*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.94*	*0.99*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*517*	*706*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

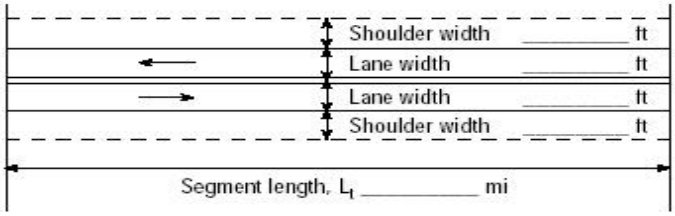
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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*

Input Data



Analysis direction vol., V_d *559*veh/h

Opposing direction vol., V_o *380*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.7*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*728*	*481*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*760*	*475*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

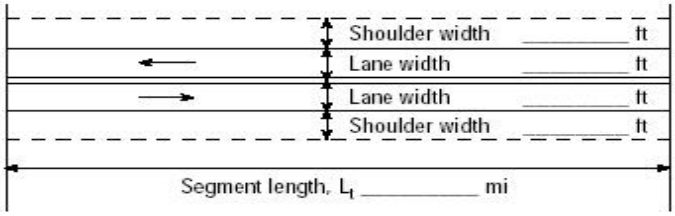
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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*

Input Data



Analysis direction vol., V_d *296*veh/h

Opposing direction vol., V_o *535*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *2.1*



☑ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.86*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*435*	*677*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.87*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*415*	*641*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

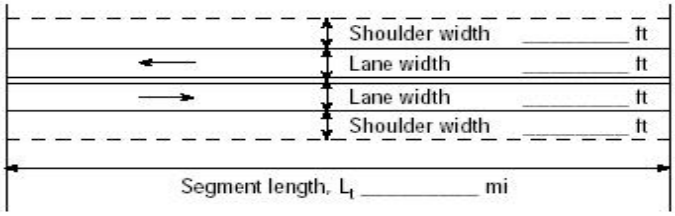
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*10/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*EPAP plus Project Peak Hour*	Analysis Year	*2019*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *535*veh/h

Opposing direction vol., V_o *296*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *2.1*



☑ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.7*	*2.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.947*	*0.919*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.86*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*677*	*435*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*29.2 mi/h*
		Percent free flow speed, PFFS	*72.3* %

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*	*1.6*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*0.87*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*641*	*415*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*58.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*32.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*78.2*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

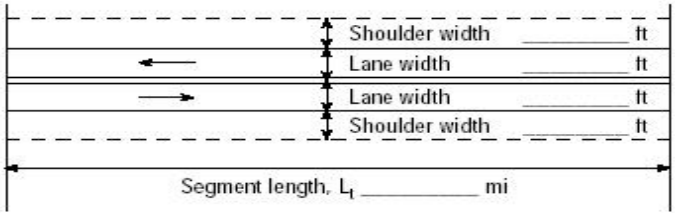
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



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%*

Show North Arrow

Analysis direction vol., V_d	*583*veh/h	% Trucks and Buses , P_T	*6* %
Opposing direction vol., V_o	*592*veh/h	% Recreational vehicles, P_R	*0%*
Shoulder width ft	*6.0*	Access points *mi*	*6*/mi
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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*693*	*703*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*0.98*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*668*	*679*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

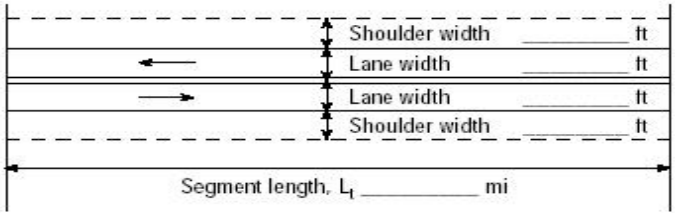
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *592*veh/h

Opposing direction vol., V_o *583*veh/h

Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *1.0*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*703*	*693*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*0.98*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*679*	*668*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	
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. 2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

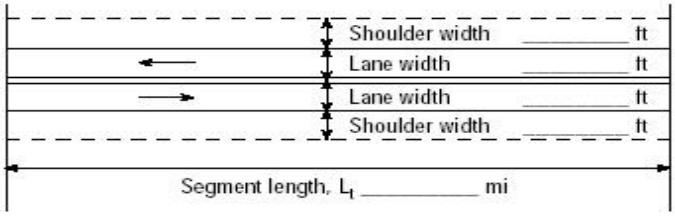
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *508*veh/h

Opposing direction vol., V_o *736*veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *0.7*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.99*
Demand flow rate[2], 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[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*606*	*836*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*577.3*
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)	*4.77*
Bicycle level of service (Exhibit 15-4)	*E*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

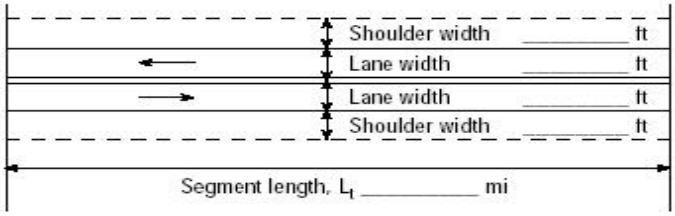
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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	*736*veh/h
Opposing direction vol., V_o	*508*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)	*1.4*	*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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.99*	*0.97*
Demand flow rate[2], 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**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*836*	*606*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

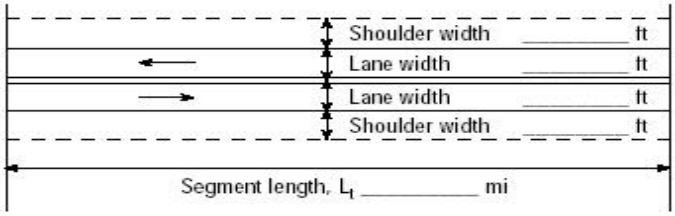
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 SR 49*

Input Data



Analysis direction vol., V_d *90*veh/h

Opposing direction vol., V_o *112*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.1*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.79*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*158*	*148*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*114*	*143*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

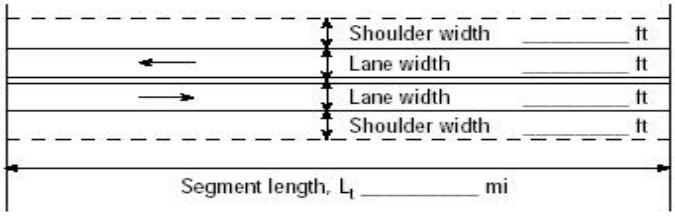
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *112*veh/h

Opposing direction vol., V_o *90*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.1*

Show North Arrow

☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.70*	*0.68*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*221*	*184*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.76*	*0.74*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*195*	*161*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

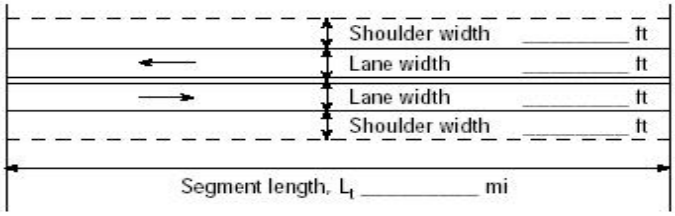
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*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



Analysis direction vol., V_d *450*veh/h

Opposing direction vol., V_o *601*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.4*



☐ 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

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, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.822*	*0.994*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*649*	*695*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.6* *mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9* *mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*34.9* *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_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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*518*	*691*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*54.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*32.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

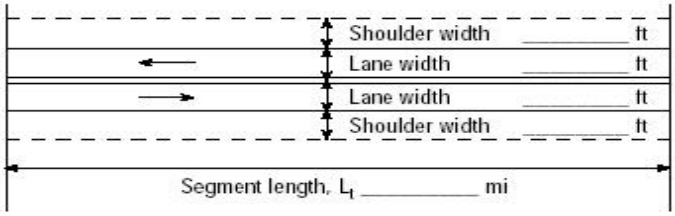
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



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 *601*veh/h

Opposing direction vol., V_o *450*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*695*	*649*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*691*	*518*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

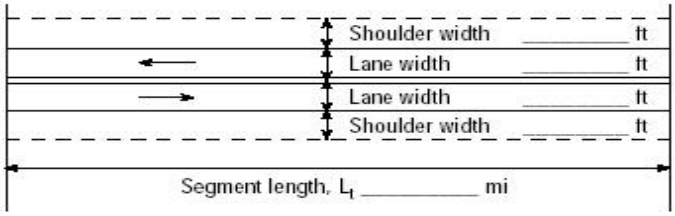
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *380*veh/h

Opposing direction vol., V_o *559*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.7*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.94*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*530*	*739*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.94*	*0.99*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*517*	*706*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

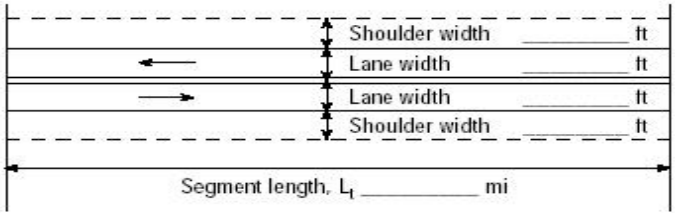
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *559*veh/h

Opposing direction vol., V_o *380*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.7*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*728*	*481*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*760*	*475*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

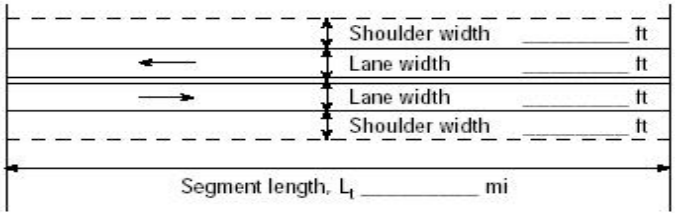
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *296*veh/h

Opposing direction vol., V_o *535*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *2.1*



☑ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.86*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*435*	*677*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.87*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*415*	*641*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

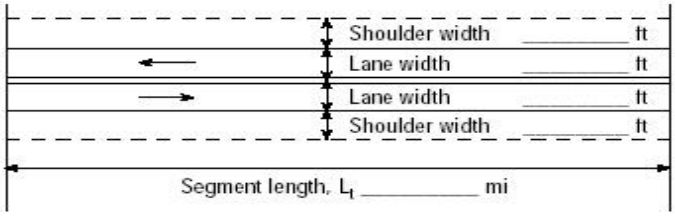
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*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



Analysis direction vol., V_d *535*veh/h

Opposing direction vol., V_o *296*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *2.1*



☑ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.7*	*2.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.947*	*0.919*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*0.86*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*677*	*435*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*29.2 mi/h*
		Percent free flow speed, PFFS	*72.3* %

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*	*1.6*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.97*	*0.87*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*641*	*415*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*58.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*32.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*78.2*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

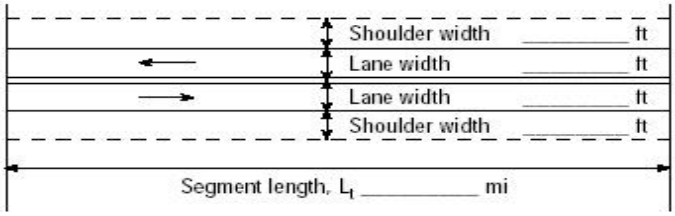
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *690*veh/h

Opposing direction vol., V_o *671*veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *1.0*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.99*	*0.99*
Demand flow rate[2], 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[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*775*	*754*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*775.3*
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

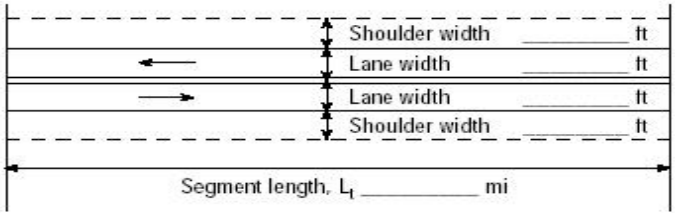
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*JF*	Highway / Direction of Travel	*Brunswick Rd SB*
Agency or Company	*Nevada County*	From/To	*Whispering Pines to 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



Show North Arrow

☐ 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 *671*veh/h

Opposing direction vol., V_o *690*veh/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)	*1.5*	*1.4*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.971*	*0.977*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.99*	*0.99*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*784*	*802*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=BFFS-f_{LS}-f_A)	*43.5 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*30.0 mi/h*
		Percent free flow speed, PFFS	*69.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*754*	*775*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*67.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*26.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*80.8*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*753.9*
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)	*3.84*
Bicycle level of service (Exhibit 15-4)	*D*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

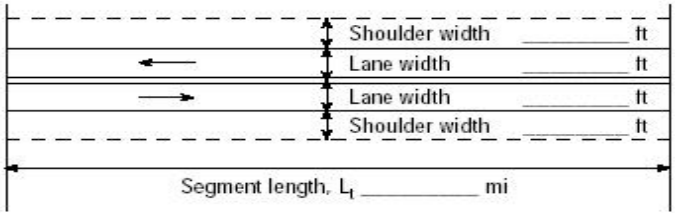
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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 *804*veh/h

Opposing direction vol., V_o *507*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[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*938*	*631*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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)	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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*914*	*605*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

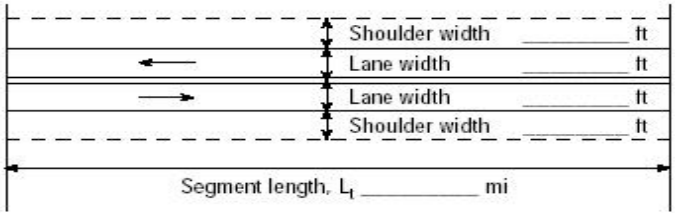
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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

Analysis direction vol., V_d *507*veh/h

Opposing direction vol., V_o *804*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)	*1.8*	*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[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*618*	*914*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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)	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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*626*	*914*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*576.1*
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)	*4.77*
Bicycle level of service (Exhibit 15-4)	*E*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

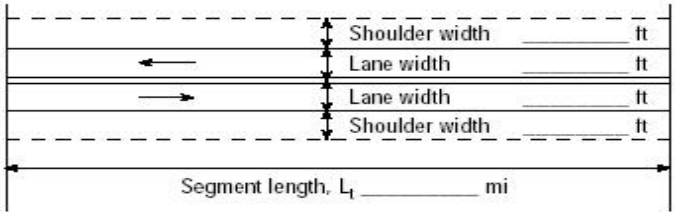
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Cumulative*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *66*veh/h

Opposing direction vol., V_o *127*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.1*



☐ 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

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, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.911*	*0.960*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.78*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*118*	*168*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.5 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*41.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*35.9 mi/h*
		Percent free flow speed, PFFS	*86.3* %

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*	*1.1*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*84*	*162*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*9.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*51.1*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*27.3*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*83.5*
Effective width, Wv (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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

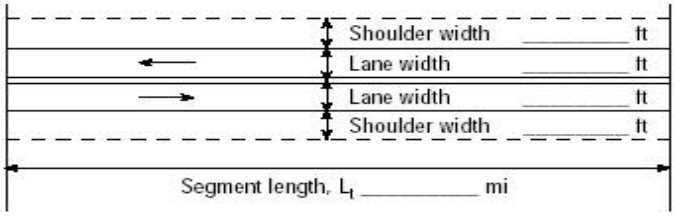
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*PM Peak Hour*	Analysis Year	*Cumulative*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *127*veh/h

Opposing direction vol., V_o *66*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.1*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.5*	*2.7*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.916*	*0.906*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.72*	*0.67*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*244*	*138*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.8 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*3.0 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*41.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*35.7 mi/h*
		Percent free flow speed, PFFS	*85.7* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.8*	*1.9*
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*	*0.949*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.77*	*0.73*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*219*	*121*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*23.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*51.6*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*56.5*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*160.8*
Effective width, Wv (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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

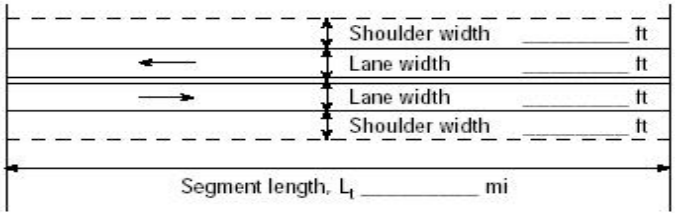
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *378*veh/h

Opposing direction vol., V_o *561*veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.4*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.87*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*615*	*649*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*434*	*645*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

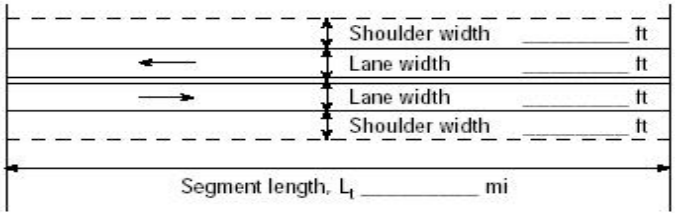
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Cumulative*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *561* veh/h

Opposing direction vol., V_o *378* veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.4*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.1*	*4.9*
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*	*0.812*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.87*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*649*	*615*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*35.3 mi/h*
		Percent free flow speed, PFFS	*75.3* %

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*	*1.0*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*645*	*434*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*58.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*34.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*79.7*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*644.8*
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)	*5.66*
Bicycle level of service (Exhibit 15-4)	*F*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
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6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

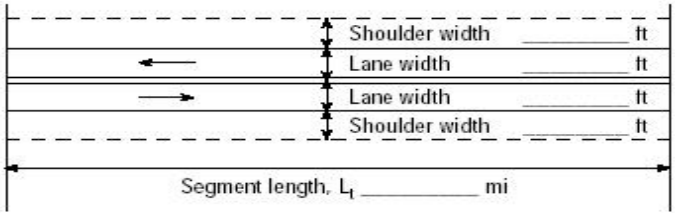
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Cumulative*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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

Analysis direction vol., V_d *378*veh/h

Opposing direction vol., V_o *561*veh/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)	*1.9*	*1.6*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.949*	*0.965*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.94*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*530*	*742*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.94*	*0.99*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*515*	*708*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*54.5*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*31.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*67.8*	

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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*472.5*
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)	*5.51*
Bicycle level of service (Exhibit 15-4)	*F*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

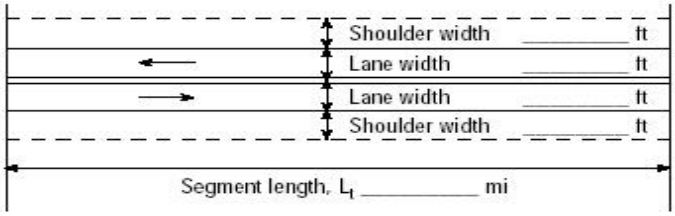
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*Cumulaitve*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *561* veh/h

Opposing direction vol., V_o *378* veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.7*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.94*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*742*	*530*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.5* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.1* *mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*44.9* *mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*32.9* *mi/h*
		Percent free flow speed, PFFS	*73.3* %

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.99*	*0.94*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*708*	*515*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*62.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*31.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*80.8*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

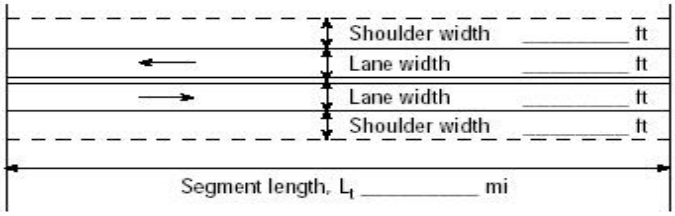
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Cumulative*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *303* veh/h

Opposing direction vol., V_o *606* veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *2.1*



☑ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.0*	*1.6*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.926*	*0.954*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.87*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*437*	*754*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.3 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*29.8 mi/h*
		Percent free flow speed, PFFS	*73.8* %

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.88*	*0.99*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*420*	*712*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*49.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*30.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*60.2*	

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	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

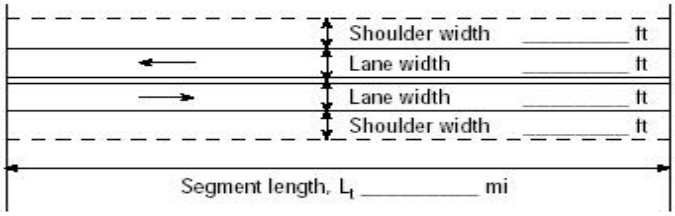
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☑ 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 *606*veh/h

Opposing direction vol., V_o *303*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.87*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*754*	*437*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.99*	*0.88*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*712*	*420*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

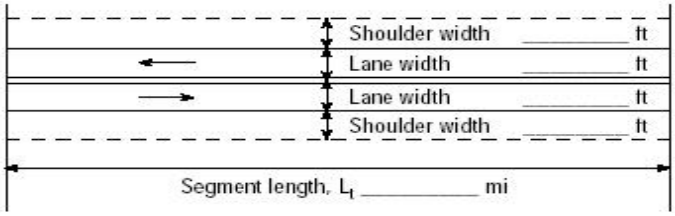
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Centennial*

Project Description: *Rise Grass Valley 2 Lanes SB*

Input Data



Analysis direction vol., V_d *717* veh/h

Opposing direction vol., V_o veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *1.0*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.99*	*0.99*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*833*	*784*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=BFFS-f_{LS}-f_A)	*43.5 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*29.7 mi/h*
		Percent free flow speed, PFFS	*68.3 %*

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*	*1.0*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*806*	*754*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*69.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*25.8*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*82.4*	

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	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

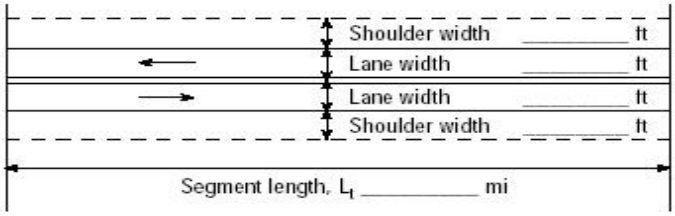
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*JF*	Highway / Direction of Travel	*Brunswick Rd SB*
Agency or Company	*Nevada County*	From/To	*Whispering Pines to 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*

Input Data



Analysis direction vol., V_d *688*veh/h

Opposing direction vol., V_o *717*veh/h

Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *1.0*



☐ 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 *0.89*
No-passing zone *100*%
% Trucks and Buses , P_T *6* %
% Recreational vehicles, P_R *0*%
Access points *mi* *6*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.4*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.976*	*0.994*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*792*	*810*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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	*68.7* %

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*840*	*806*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*70.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*24.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*83.2*	

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	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

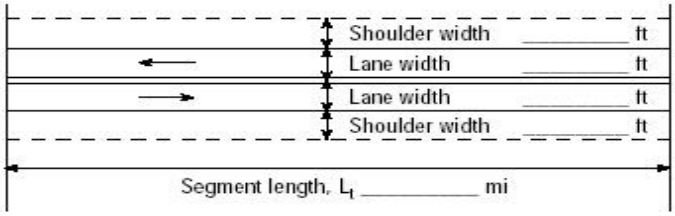
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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 *861*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*1005*	*631*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*0.97*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*978*	*605*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

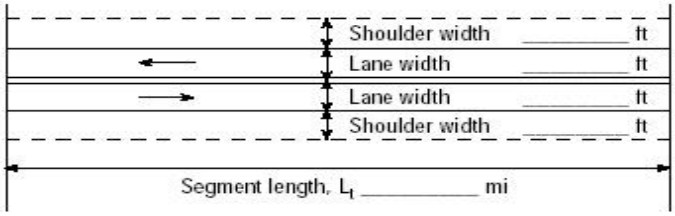
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*CPP Centennial*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *590*veh/h

Opposing direction vol., V_o *861*veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *0.7*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.6*	*1.3*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.949*	*0.974*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*721*	*1005*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*1.0* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.1* *mi/h*	Free-flow speed, FFS (FSS=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*	*1.0*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*684*	*978*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*66.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*23.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*76.1*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

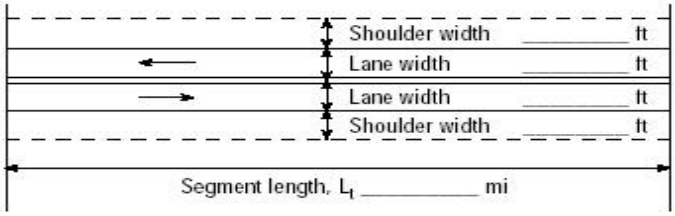
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*CPP Centennial*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *84* veh/h

Opposing direction vol., V_o *139* veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.1*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.7*	*2.4*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.906*	*0.921*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.67*	*0.73*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*175*	*262*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.73*	*0.78*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*153*	*236*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*17.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*54.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*38.8*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

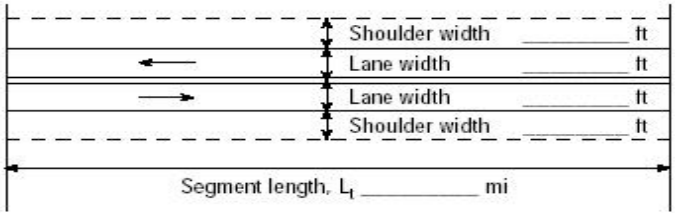
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Show North Arrow

☐ 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 *139*veh/h

Opposing direction vol., V_o *84*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.73*	*0.67*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*262*	*175*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.78*	*0.73*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*236*	*153*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*175.9*
Effective width, Wv (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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

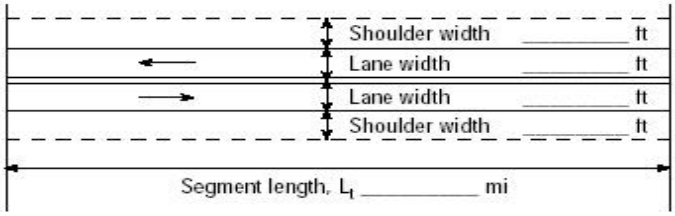
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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 Centennial*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *463* veh/h

Opposing direction vol., V_o veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.4*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*667*	*711*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=BFFS-f_{LS}-f_A)	*46.9 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*34.7 mi/h*
		Percent free flow speed, PFFS	*74.0* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*533*	*707*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*55.5*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*31.7*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*69.1*	

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	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*532.2*
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)	*5.57*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

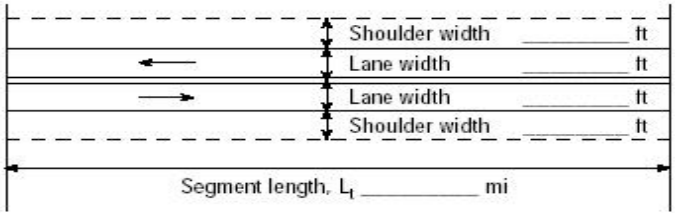
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*Peak Hour*	Analysis Year	*CPP Centennial*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *625*veh/h

Opposing direction vol., V_o *463*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.4*



☐ 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

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*	*0.823*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*723*	*667*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.6 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*34.5 mi/h*
		Percent free flow speed, PFFS	*73.5* %

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*718*	*533*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*63.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*31.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*81.1*	

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	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*718.4*
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)	*5.72*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

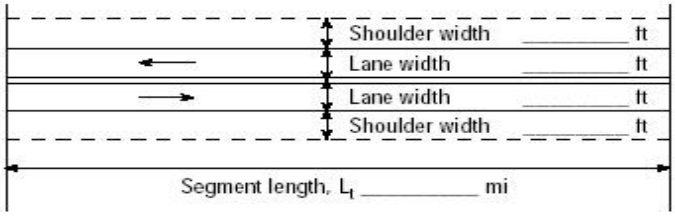
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*Peak Hour*	Analysis Year	*CPP Centennial*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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*%

Analysis direction vol., V_d *393*veh/h

Opposing direction vol., V_o *583*veh/h

% Trucks and Buses , P_T *6* %

% Recreational vehicles, P_R *0*%

Access points *mi* *10*/mi

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*	*1.5*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.954*	*0.971*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.95*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*542*	*766*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.3 mi/h*	Free-flow speed, FFS (FSS=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	*74.5* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.4*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.95*	*0.99*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*530*	*736*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*56.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*30.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*68.8*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

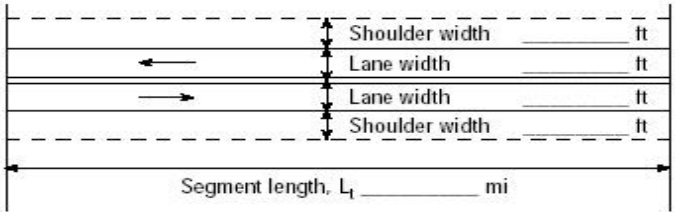
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*Peak Hour*	Analysis Year	*CPP Centennial*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *583* veh/h

Opposing direction vol., V_o *393* veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.7*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.5*	*1.8*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.971*	*0.954*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.95*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*766*	*542*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.5* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.1* *mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*44.9* *mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*32.7* *mi/h*
		Percent free flow speed, PFFS	*72.8* %

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*	*1.4*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.99*	*0.95*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*736*	*530*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*64.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*30.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*81.8*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

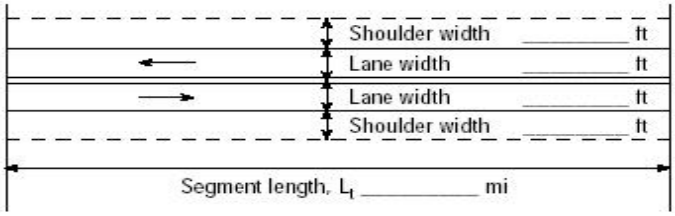
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*Peak Hour*	Analysis Year	*CPP Centennial*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *309* veh/h

Opposing direction vol., V_o *610* veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *2.1*



☑ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.0*	*1.6*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.926*	*0.954*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.87*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*446*	*759*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.3 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*29.7 mi/h*
		Percent free flow speed, PFFS	*73.6* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	*1.6*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.88*	*0.99*
Directional flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*428*	*716*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*49.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*60.8*	

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	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

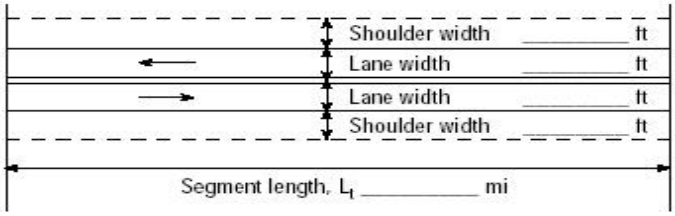
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*Peak Hour*	Analysis Year	*CPP Centennial*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *610*veh/h

Opposing direction vol., V_o *309*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *2.1*



☑ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.87*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*759*	*446*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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	*70.7* %

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*	*1.6*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.99*	*0.88*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*716*	*428*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*62.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*709.3*
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)	*6.40*
Bicycle level of service (Exhibit 15-4)	*F*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

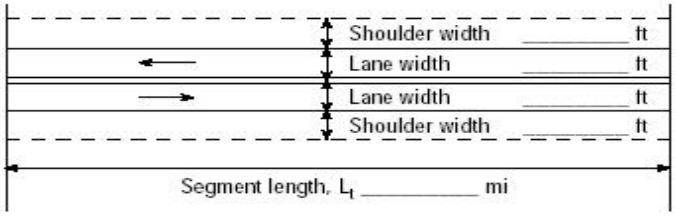
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *724*veh/h

Opposing direction vol., V_o *696*veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *1.0*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.99*	*0.99*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*841*	*809*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*813*	*782*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*813.5*
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)	*3.88*
Bicycle level of service (Exhibit 15-4)	*D*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

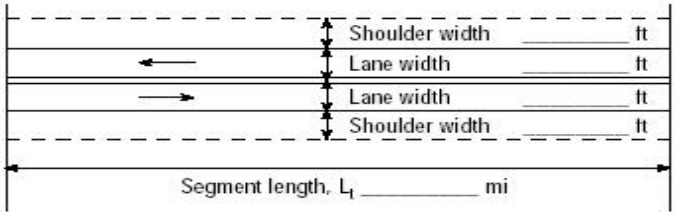
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*JF*	Highway / Direction of Travel	*Brunswick Rd SB*
Agency or Company	*Nevada County*	From/To	*Whispering Pines to 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



Analysis direction vol., V_d *696*veh/h

Opposing direction vol., V_o *724*veh/h

Shoulder width ft *6.0*
Lane Width ft *12.0*
Segment Length mi *1.0*



☐ 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 *0.89*
No-passing zone *100*%
% Trucks and Buses , P_T *6* %
% Recreational vehicles, P_R *0*%
Access points *mi* *6*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.4*	*1.1*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.978*	*0.994*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*800*	*818*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=BFFS-f_{LS}-f_A)	*43.5 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*29.8 mi/h*
		Percent free flow speed, PFFS	*68.4* %

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*850*	*813*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*71.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*24.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*83.5*	

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	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*782.0*
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

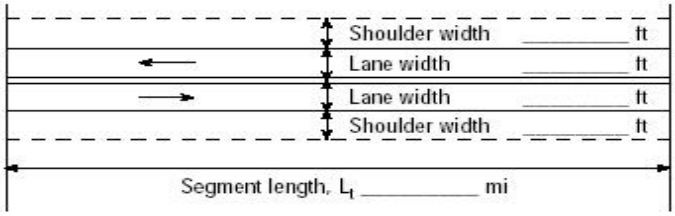
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *861*veh/h

Opposing direction vol., V_o *590*veh/h

Shoulder width ft *6.0*

Lane Width ft *12.0*

Segment Length mi *0.7*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*1005*	*721*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*0.98*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*978*	*684*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

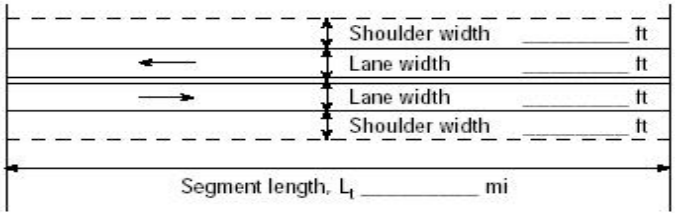
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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 *590*veh/h

Opposing direction vol., V_o *861*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)	*1.6*	*1.3*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.949*	*0.974*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*721*	*1005*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*1.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.1 mi/h*	Free-flow speed, FFS (FSS=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*	*1.0*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.98*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*684*	*978*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*66.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*23.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*76.1*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

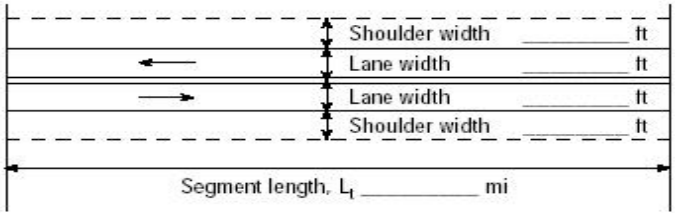
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period		Analysis Year	*CPP SR 49*

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☐ 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 *84*veh/h

Opposing direction vol., V_o *139*veh/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*	*2.4*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.906*	*0.921*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.67*	*0.73*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*175*	*262*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.73*	*0.78*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*153*	*236*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*17.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*54.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*38.8*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

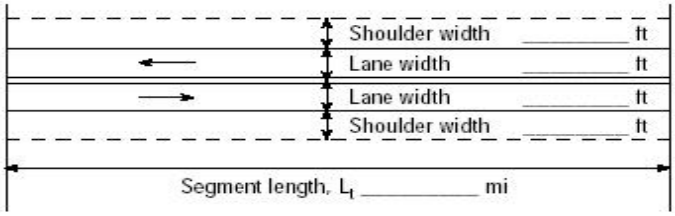
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



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 *139*veh/h

Opposing direction vol., V_o *84*veh/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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.73*	*0.67*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*262*	*175*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.78*	*0.73*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*236*	*153*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*175.9*
Effective width, Wv (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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

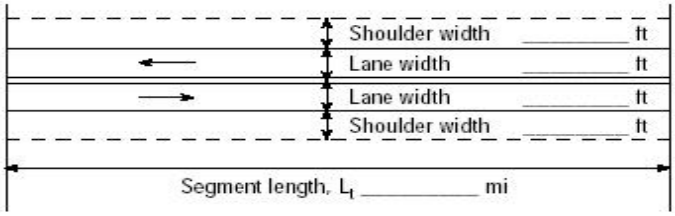
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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



Analysis direction vol., V_d *463*veh/h

Opposing direction vol., V_o *625*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.4*



☐ 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

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.97*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*667*	*723*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*533*	*718*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*532.2*
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)	*5.57*
Bicycle level of service (Exhibit 15-4)	*F*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

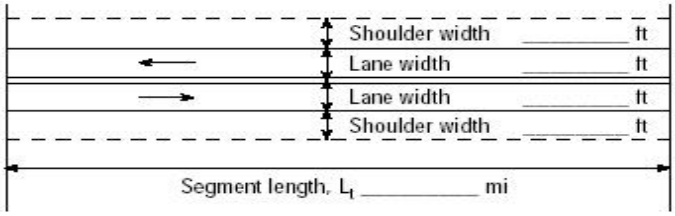
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*Peak Hour*	Analysis Year	*CPP SR 49*

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *625*veh/h

Opposing direction vol., V_o *463*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.4*



☐ 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

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*	*0.823*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*0.97*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*723*	*667*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*0.5 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.6 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*46.9 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*34.5 mi/h*
		Percent free flow speed, PFFS	*73.5* %

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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*718*	*533*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*63.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*31.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*81.1*	

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	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*718.4*
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)	*5.72*
Bicycle level of service (Exhibit 15-4)	*F*
Notes	

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

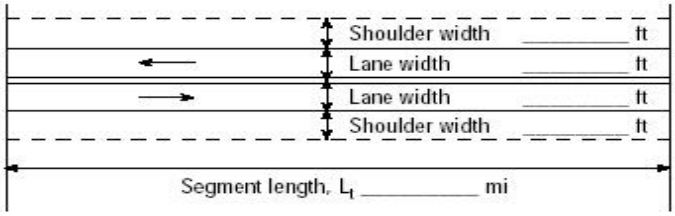
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*Peak Hour*	Analysis Year	

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *393* veh/h

Opposing direction vol., V_o *583* veh/h

Shoulder width ft *2.0*

Lane Width ft *12.0*

Segment Length mi *0.7*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.8*	*1.5*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.954*	*0.971*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.95*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*542*	*766*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.5* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.3* *mi/h*	Free-flow speed, FFS (FSS=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	*74.5* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.4*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.95*	*0.99*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*530*	*736*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*56.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*30.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*68.8*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

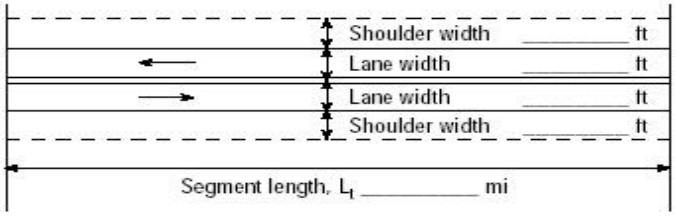
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*Peak Hour*	Analysis Year	

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *583* veh/h

Opposing direction vol., V_o *393* veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *0.7*



☐ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.5*	*1.8*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.971*	*0.954*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.95*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*766*	*542*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.5* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*2.1* *mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*44.9* *mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*32.7* *mi/h*
		Percent free flow speed, PFFS	*72.8* %

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*	*1.4*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.99*	*0.95*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*736*	*530*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*64.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*30.5*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*81.8*	

Level of Service and Other Performance Measures

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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

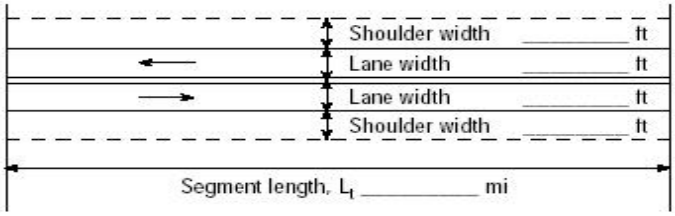
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*12/23/2019*	Jurisdiction	*NV County*
Analysis Time Period	*Peak Hour*	Analysis Year	

Project Description: *Rise Grass Valley*

Input Data



Analysis direction vol., V_d *309*veh/h

Opposing direction vol., V_o *610*veh/h

Shoulder width ft *2.0*
Lane Width ft *12.0*
Segment Length mi *2.1*



☑ 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

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*2.0*	*1.6*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.926*	*0.954*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.87*	*0.98*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*446*	*759*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], f_A (Exhibit 15-8)	*2.0* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.3* *mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*40.4* *mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*29.7* *mi/h*
		Percent free flow speed, PFFS	*73.6* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.6*	*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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.88*	*0.99*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*428*	*716*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*49.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*60.8*	

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	*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*
Bicycle Level of Service	
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*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

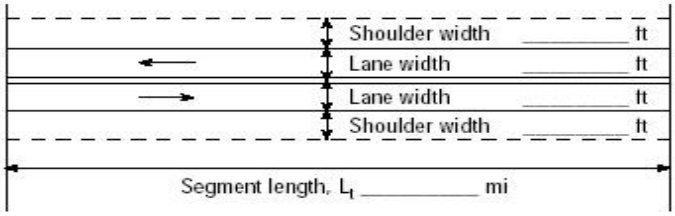
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

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	*Peak Hour*	Analysis Year	

Project Description: *Rise Grass Valley*

Input Data



Show North Arrow

☑ 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*%

Analysis direction vol., V_d	*610*veh/h
Opposing direction vol., V_o	*309*veh/h
Shoulder width ft	*2.0*
Lane Width ft	*12.0*
Segment Length mi	*2.1*
% Trucks and Buses , P_T	*8* %
% Recreational vehicles, P_R	*0*%
Access points *mi*	*8*/mi

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[1], $f_{g,ATS}$ (Exhibit 15-9)	*0.98*	*0.87*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*759*	*446*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*45.0* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] 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[4], 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 (FSS=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	*70.7* %

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*	*1.6*
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[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.99*	*0.88*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*716*	*428*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*62.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*29.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*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*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*709.3*
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)	*6.40*
Bicycle level of service (Exhibit 15-4)	*F*

Notes

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.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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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.

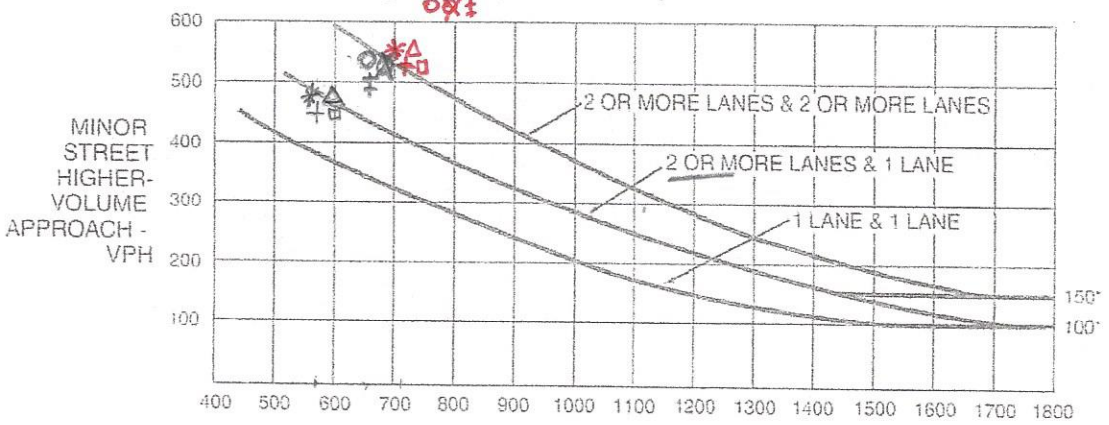
Prepared By:

KD Anderson & Associates, Inc.
3853 Taylor Road, Suite G
Loomis, CA 95650
(916) 660-1555



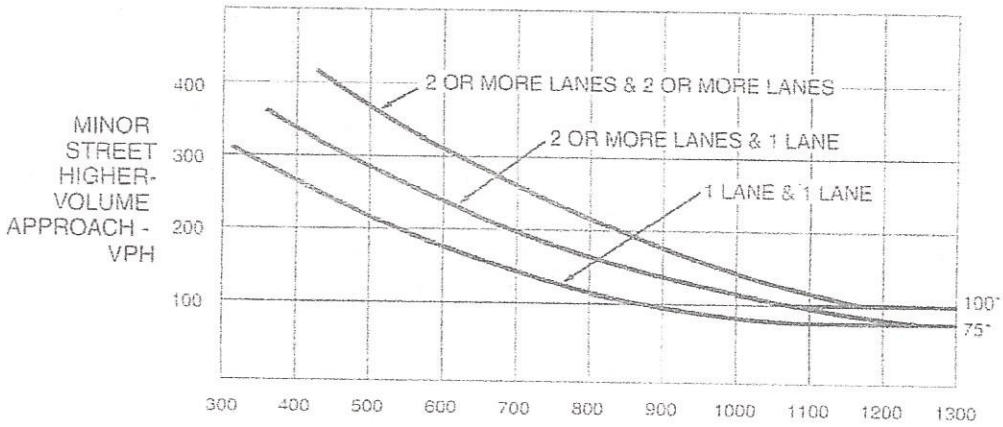
April 26, 2022

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)

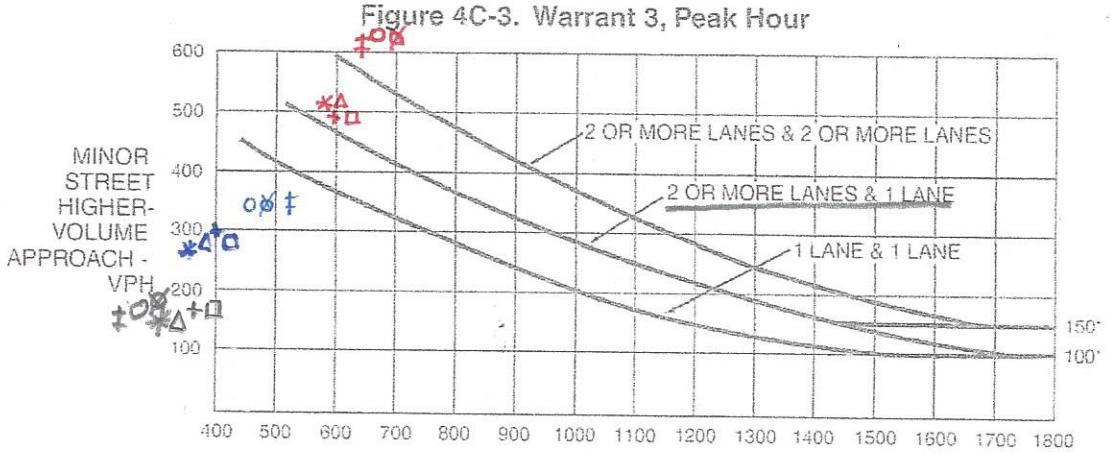


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	*	*
EPAP	△	△
EPAP PP CENTENNIAL	+	+
EPAP PP SR 49	□	□
CUM	○	○''
CPP CENTENNIAL	⊠	⊠
CPP SR 49	‡	‡

#3 E.BENNETT/ TW LOY

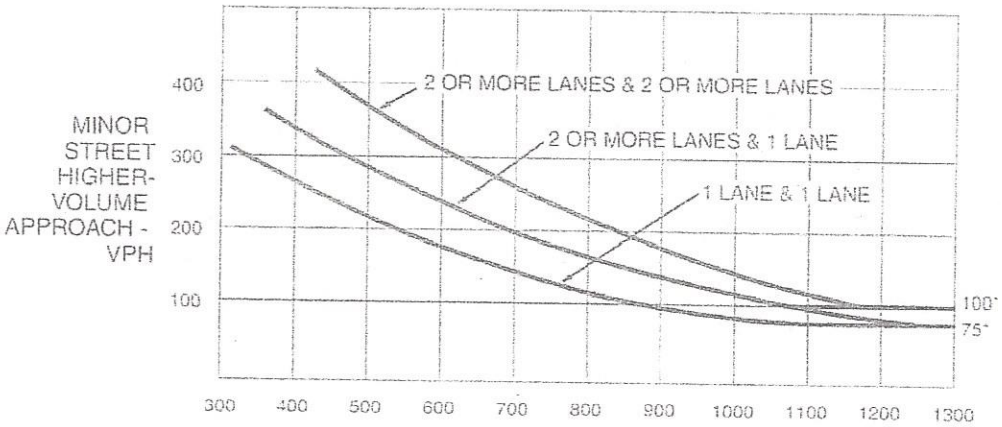
Figure 4C-3. Warrant 3, Peak Hour



*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)

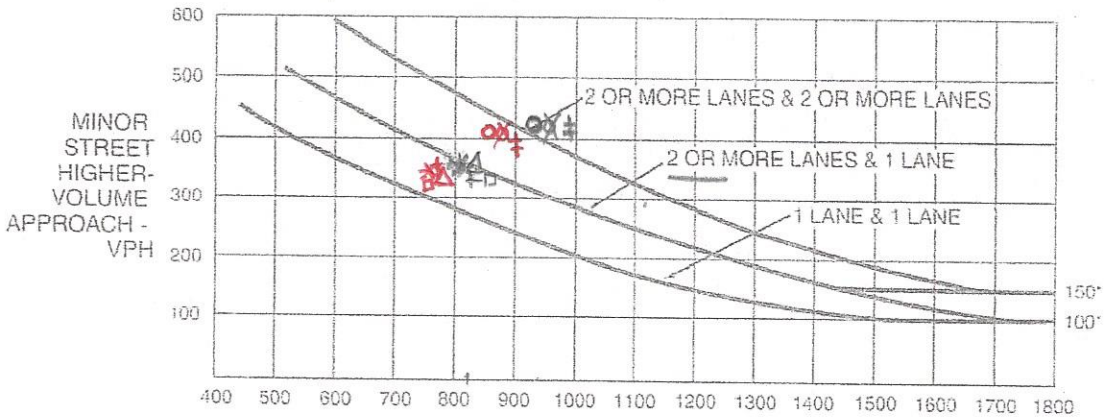


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	6:30 AM	3:30 PM	6:30 PM
EXIST	*	*	*
EPAP	Δ	Δ	Δ
EPAPPP CENTENNIAL	+	+	+
EPAPPP SR49	□	□	□
CUMULATIVE	○	○	○
CPP CENTENNIAL	⊗	⊗	⊗
CPP - SR49	‡	‡	‡

3, E BENNETT / TINLOY

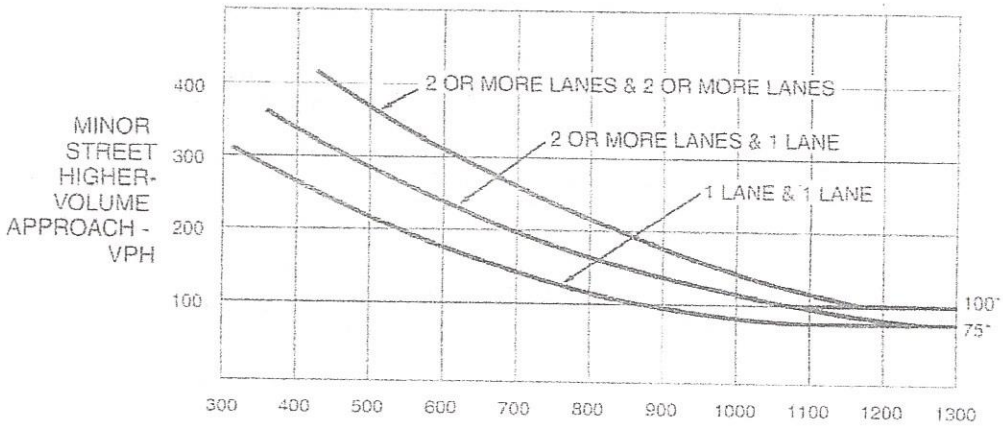
Figure 4C-3. Warrant 3, Peak Hour



*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)

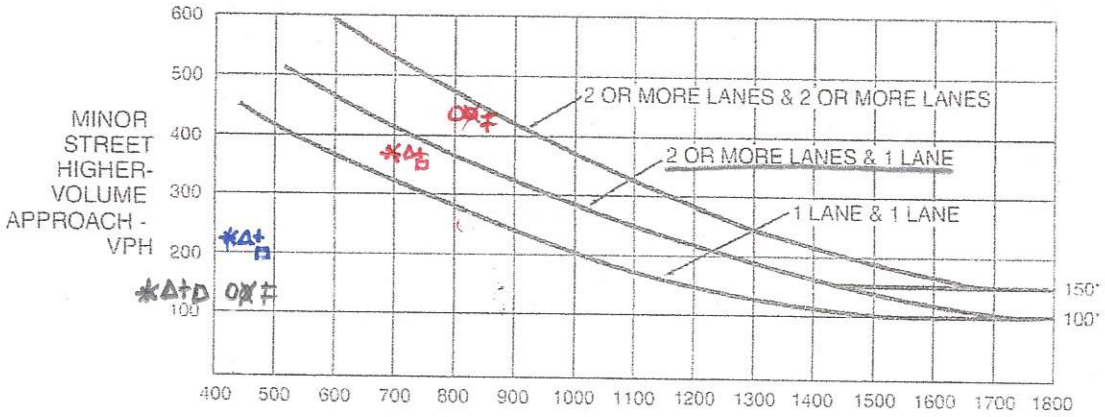


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	*	*
EP AP	△	△
EP APPP CENTENNIAL	+	+
EP APPP SR49	□	□
CUM	○	○
CPP CENTENNIAL	⊠	⊠
CPP SR49	‡	‡

#4 E. BENNETT/ HANSEN

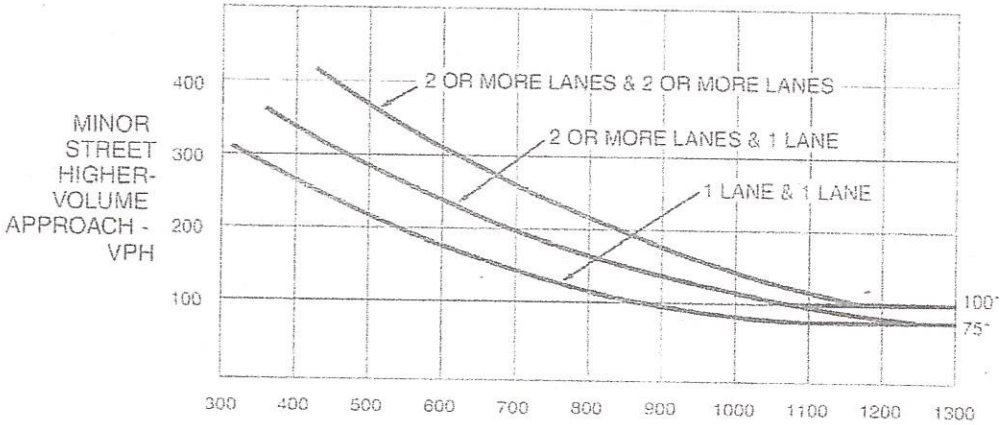
Figure 4C-3. Warrant 3, Peak Hour



*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)



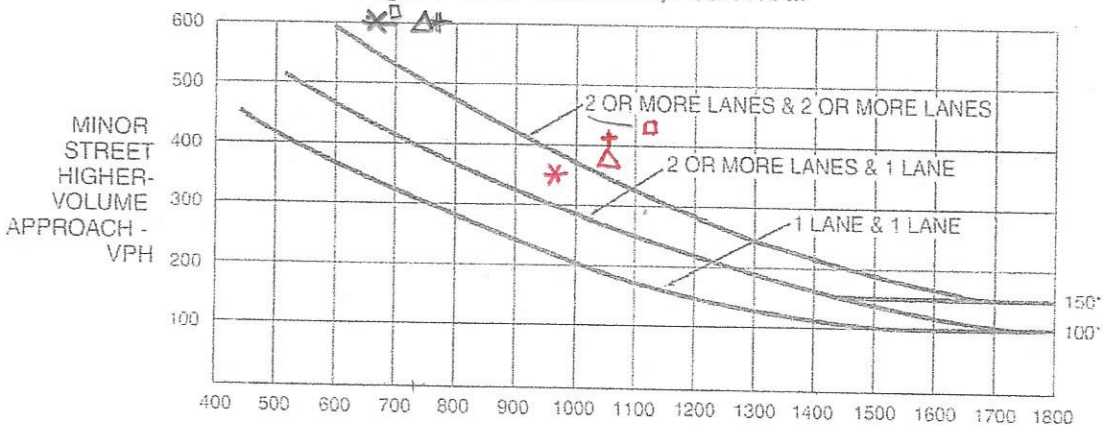
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6 30 AM 3 30 PM 6 30 PM

EXIST
EPAP
EPAPPP CENTENNIAL
EPAPPP SR49
CUMULATIVE -
CPP CENTENNIAL
CPP SR 49

4. E BENNETT / HANSEN

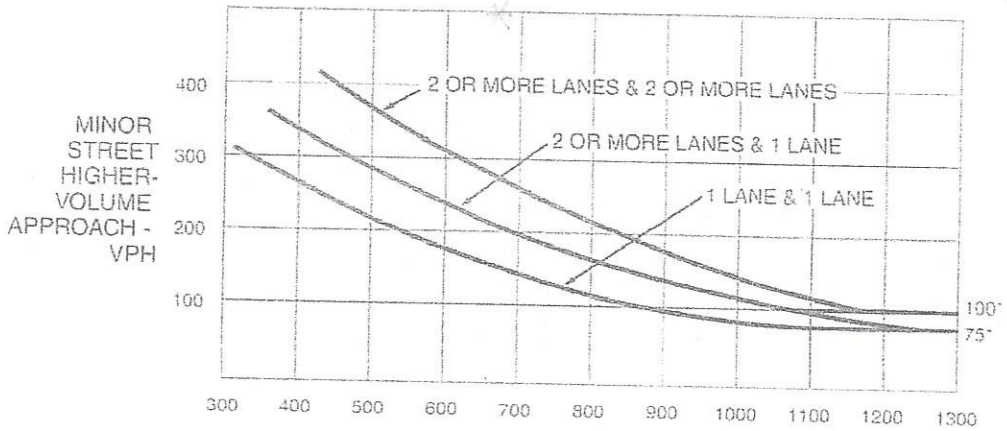
Figure 4C-3. Warrant 3, Peak Hour



*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)

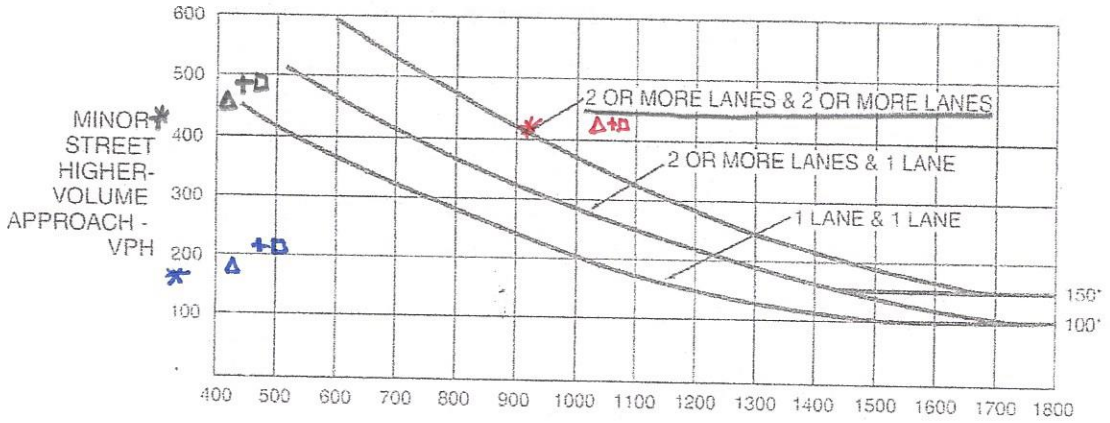


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	✳	✳
EPAP	△	△
EPAPP LEWTENNAL	+	+
EPAPP SR49	□	□
CUM — —	SIGNALIZED	

#6 IDAHOMARYLAND/
SR49/20 EB

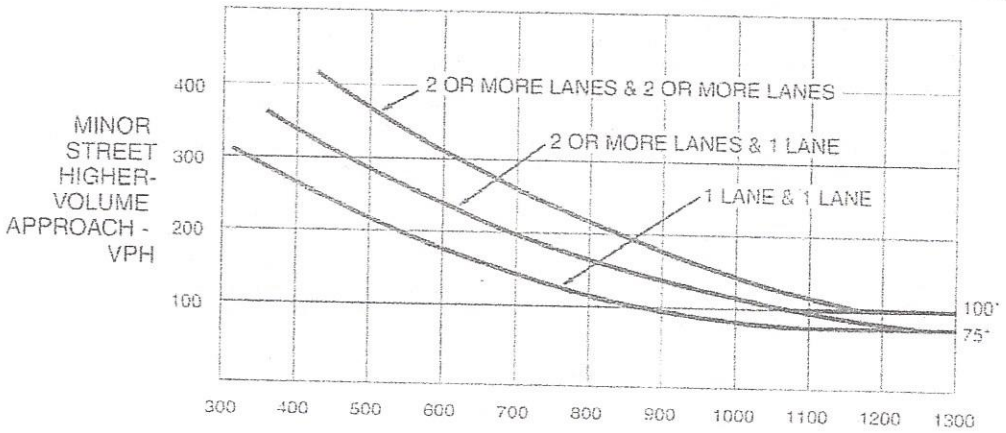
Figure 4C-3. Warrant 3, Peak Hour



*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)



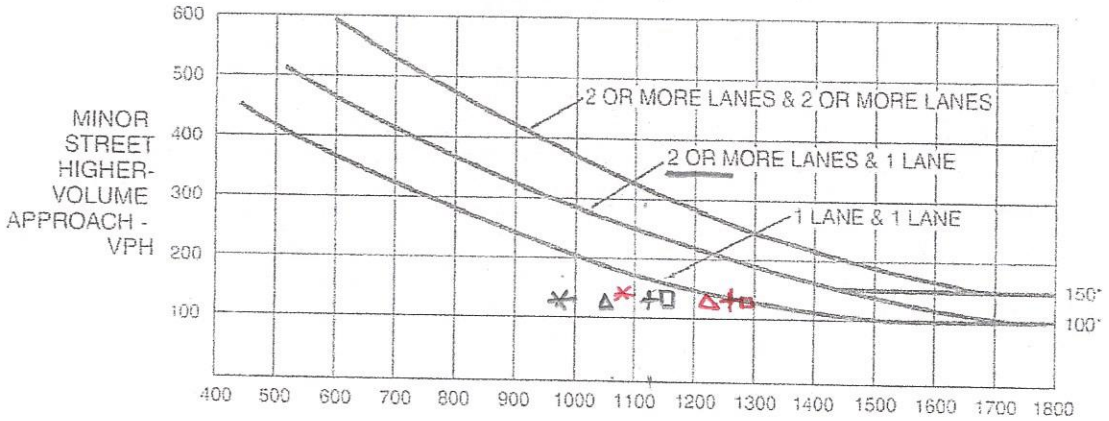
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6:30 AM 3:30 PM 6:30 PM

EXIST
EPAP
EPAPPP CENTENNIAL
EPAPPP SR49
CUMULATIVE- SIGNAL

6. IDAHO MARYLAND / SR49/20 NB RAB

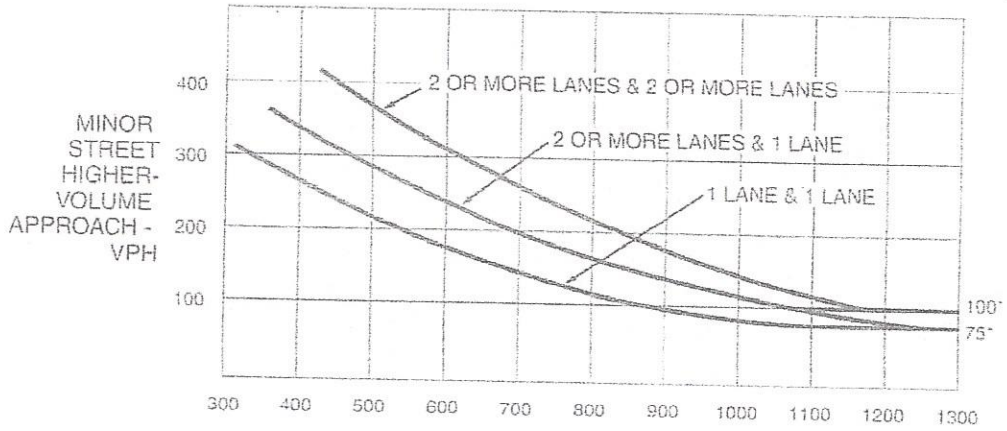
Figure 4C-3. Warrant 3, Peak Hour



*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)

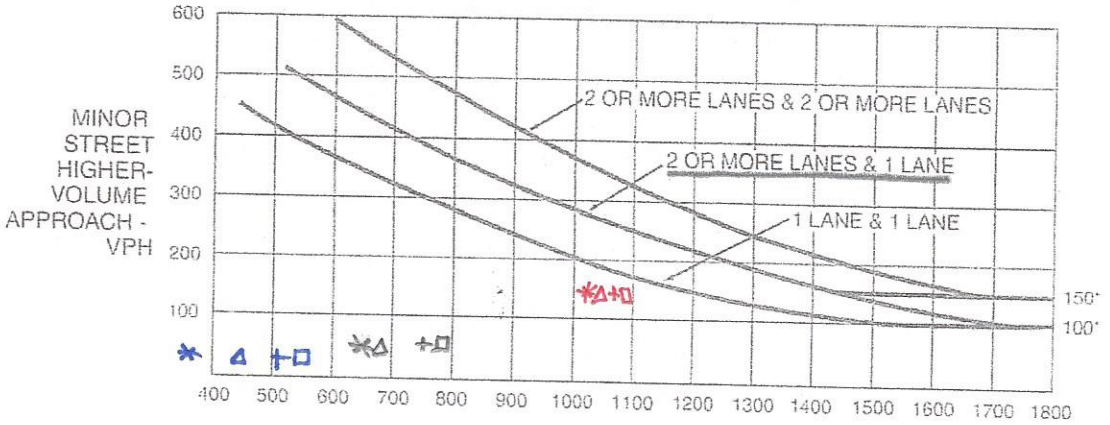


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	*	*
EPAP	△	△
EOAPPP CENTENNIAL	+	+
EPAPPP SR49	□	□
CUM	- - SIGNALIZED	

7. IDAHO MARYLAND/ RAILROAD

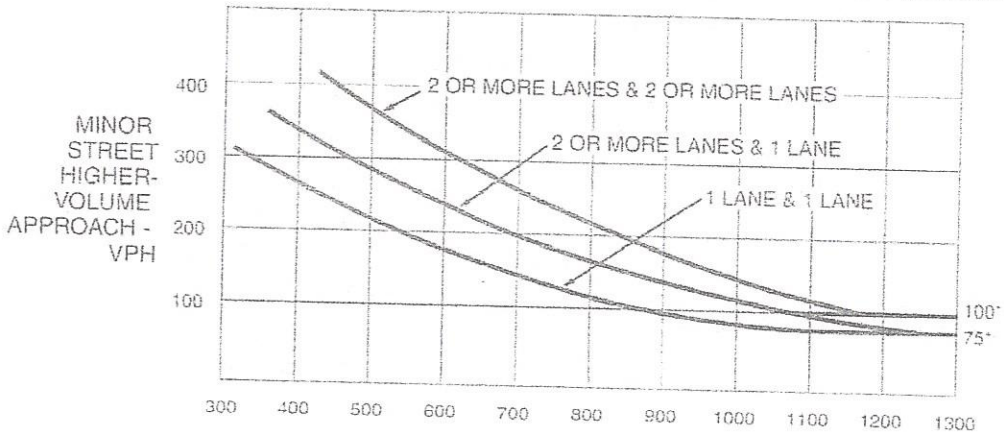
Figure 4C-3. Warrant 3, Peak Hour



*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)



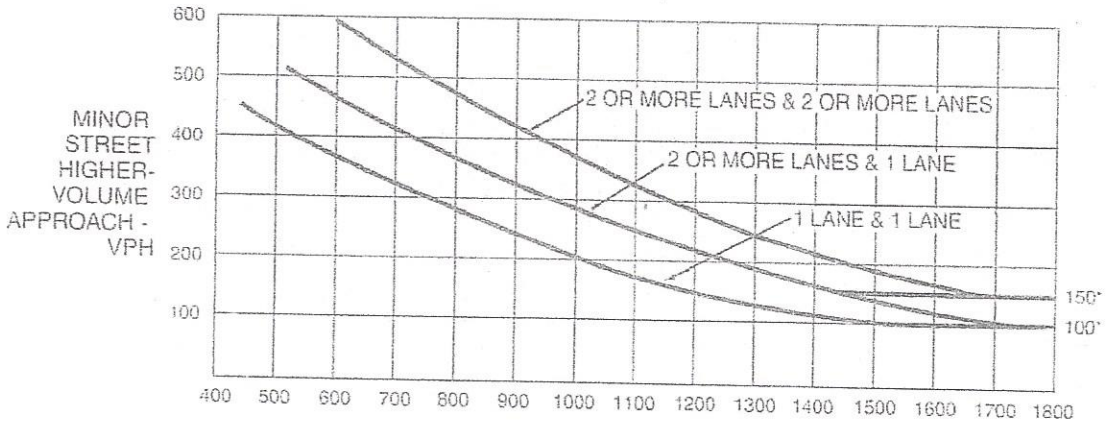
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6:30 AM 3:30 PM 6:30 PM

EXIST
EPAP
EPAPPP CENTENNIAL
EPAPPP SR49
CUMULATIVE - SIGNAL

7. IDAHO MARYLAND/ RAILROAD

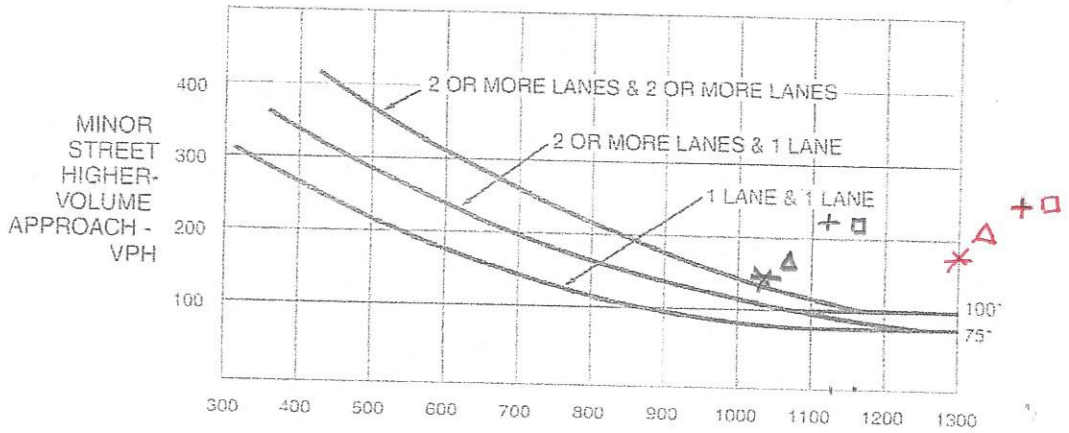
Figure 4C-3. Warrant 3, Peak Hour



*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)

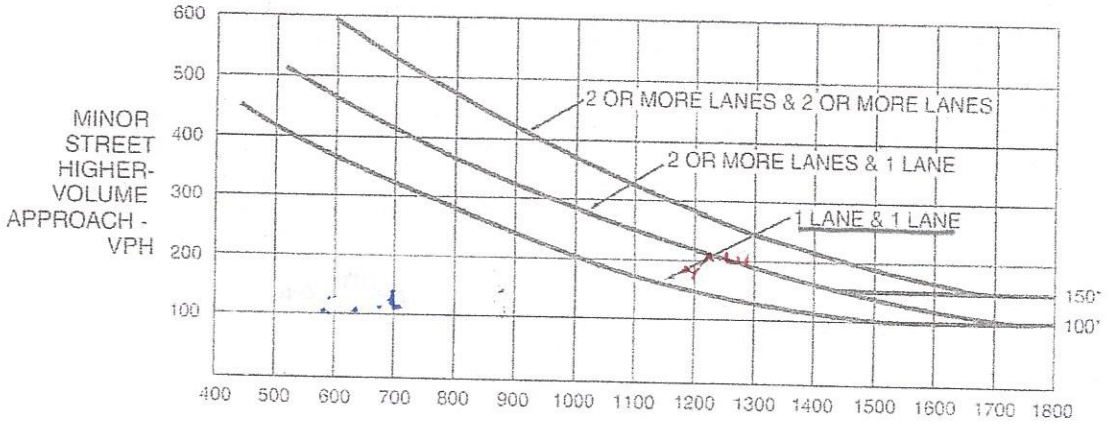


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	*	*
EPAP	△	△
EPAPPP CENTENNIAL	+	+
EPAPPP SR49	□	□
CUM -- SIGNALIZED		

12, BRUNSWICK / IDAHO MARYLAND

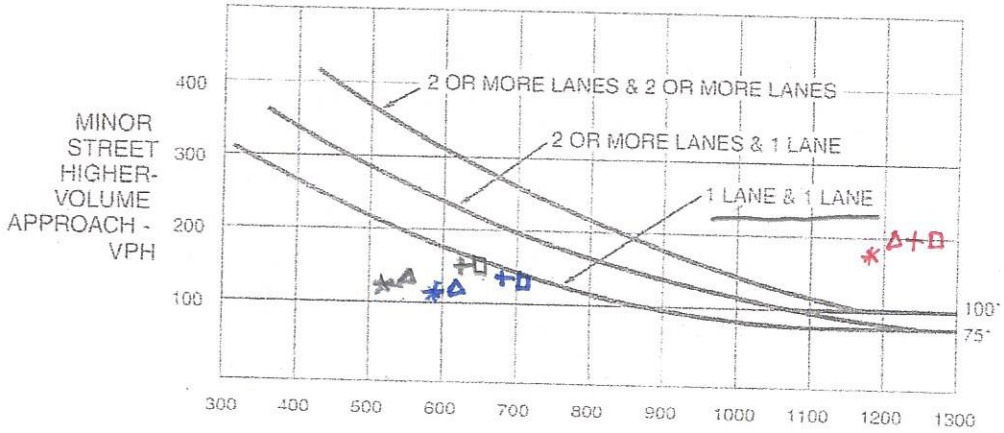
Figure 4C-3. Warrant 3, Peak Hour



*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.

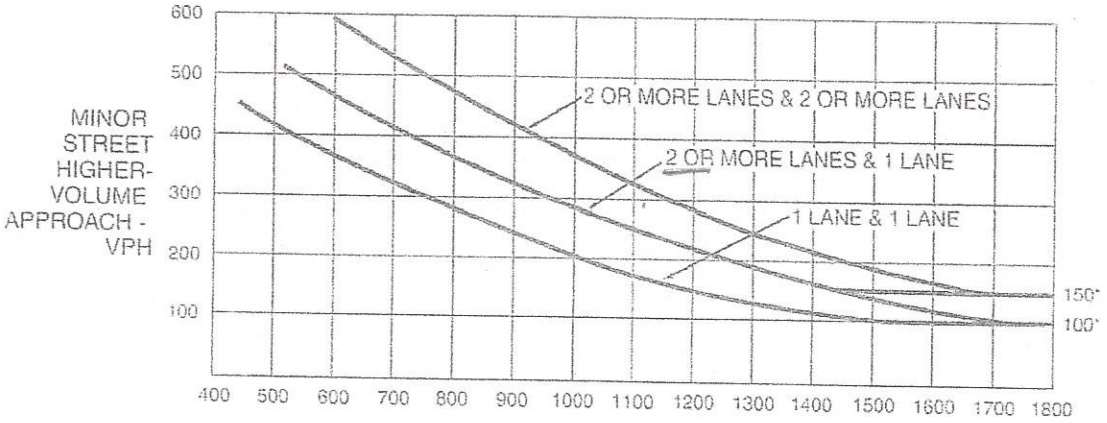
6^{30} AM · 3^{30} PM 6^{30} PM

EXIST
EPAP
EPAPPP CENTENNIAL
EPAPPP SR49

CUMULATIVE- SIGNAL

12. BRUNSWICK/
IDAHO MARYLAND

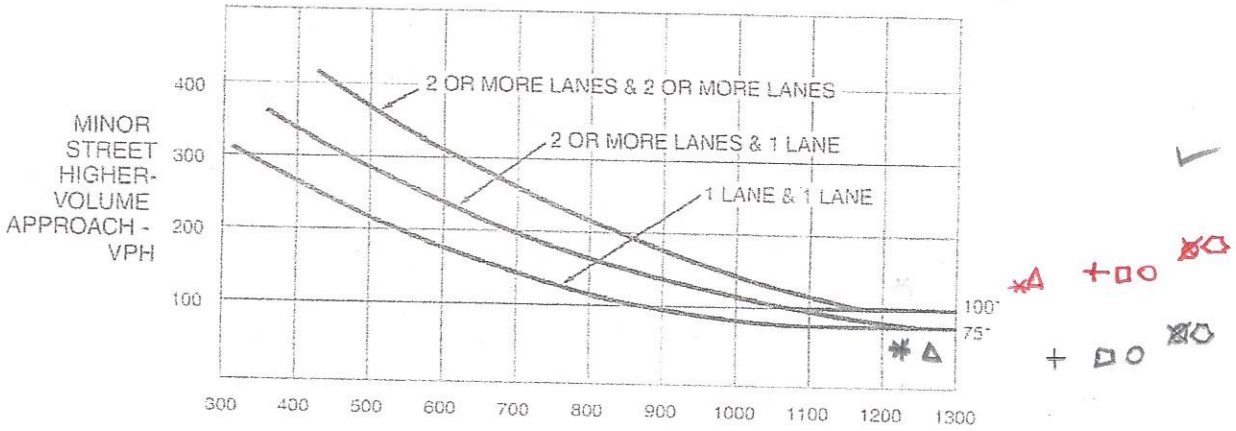
Figure 4C-3. Warrant 3, Peak Hour



*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)

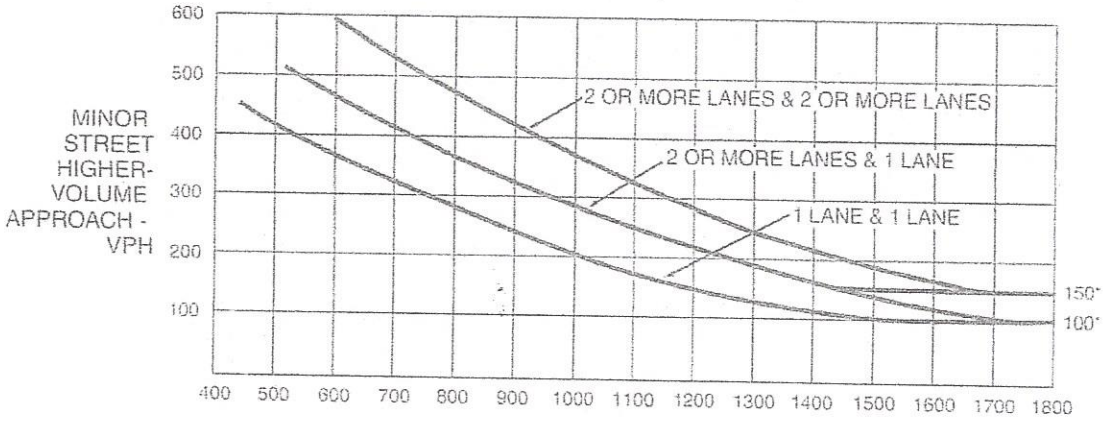


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	✳	✳
EPAP	△	△
EPAPPP CENTENNIAL	+	+
EPAPPP SR49	□	□
CUM	○	○
CPP CENT	⊠	⊠
CPP SR49	⬠	⬠

13. BRUNSWICK/ WHISPERING PINES

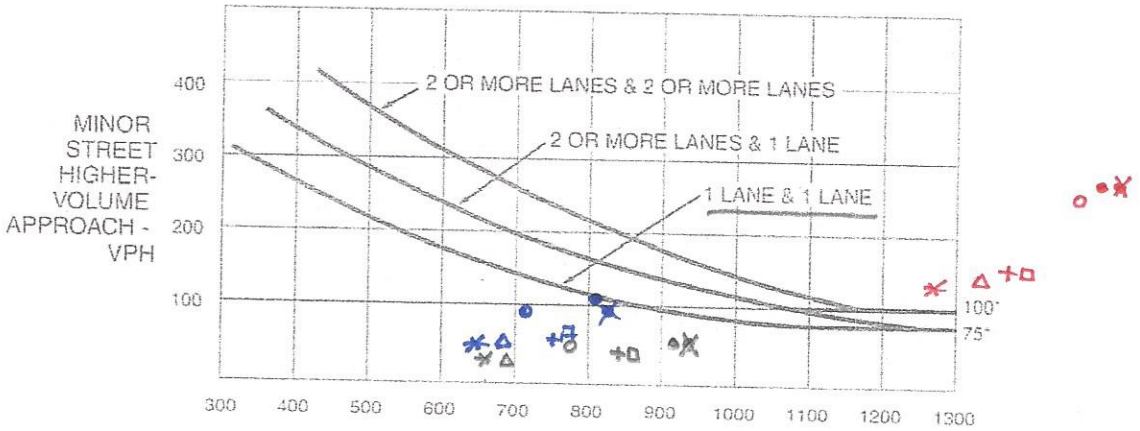
Figure 4C-3. Warrant 3, Peak Hour



*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)

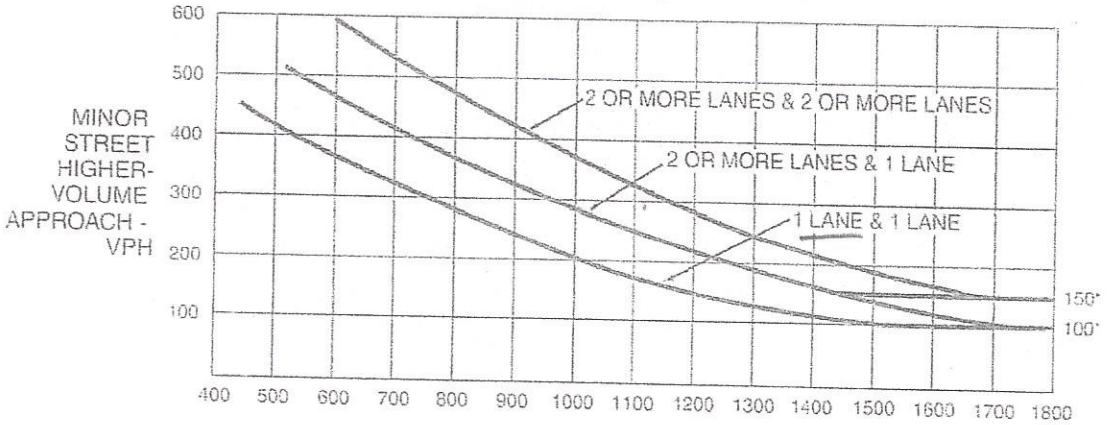


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	6:30 AM	3:30 PM	6:30 PM
EXIST.	*	*	*
EPAP	△	△	△
EPAPP CENTENNIAL	+	+	+
EPAPP SR49	□	□	□
CUM	○	○	○
CPP CENTENNIAL	●	●	●
CPP SR49	✱	✱	✱

13. BRUNSWICK/ WHISPERING PINES

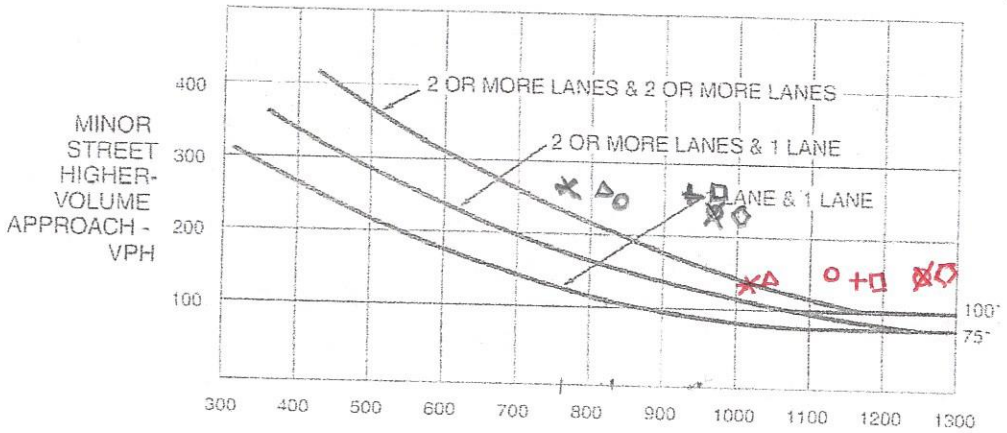
Figure 4C-3. Warrant 3, Peak Hour



*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)

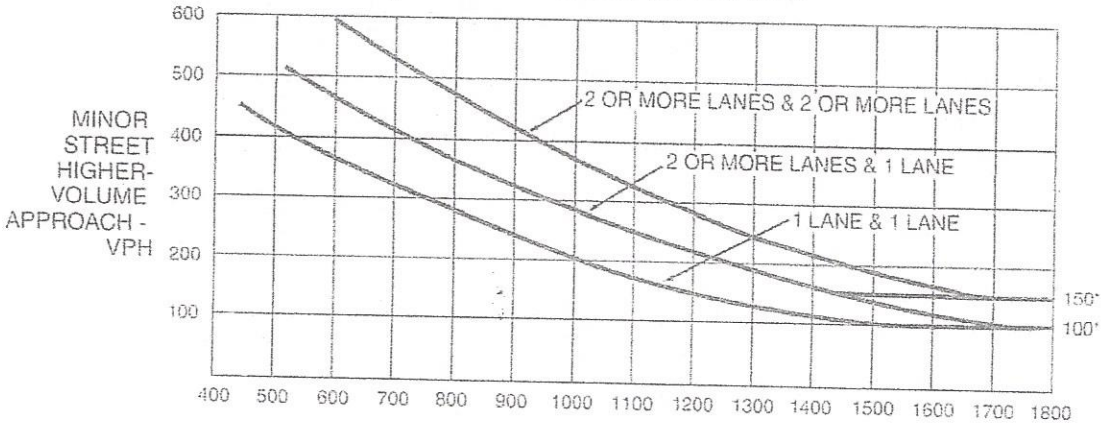


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EAST	*	*
EPAP	△	△
EPAPP CENTENNIAL	+	+
EPAPP SR49	□	□
CUM	○	○
CPP CENT	⊗	⊗
CPP SR49	⬡	⬡

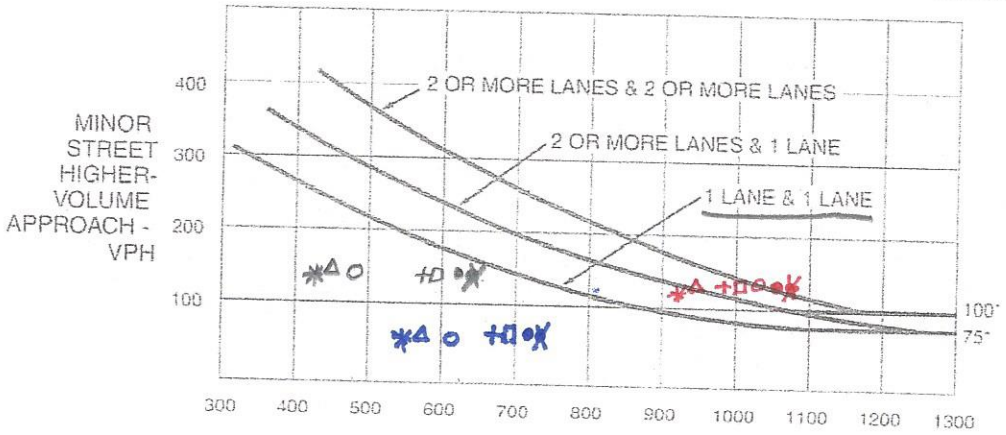
14. BRUNSWICK / E. BENNETT

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)



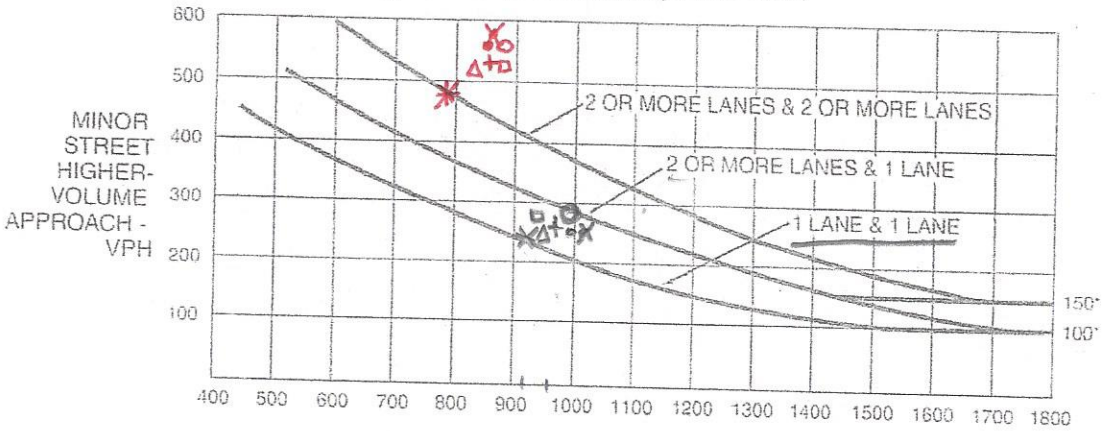
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6 30 AM . 3 30 PM 6 30 PM

EXIST *
EPAP △
EPAPPP CENTENNIAL +
EPAPPP SR49 □
CUM ○
CPP CENTENNIAL •
CPP SR49 ✗

14. BRUNSWICK/
E. BENNETT

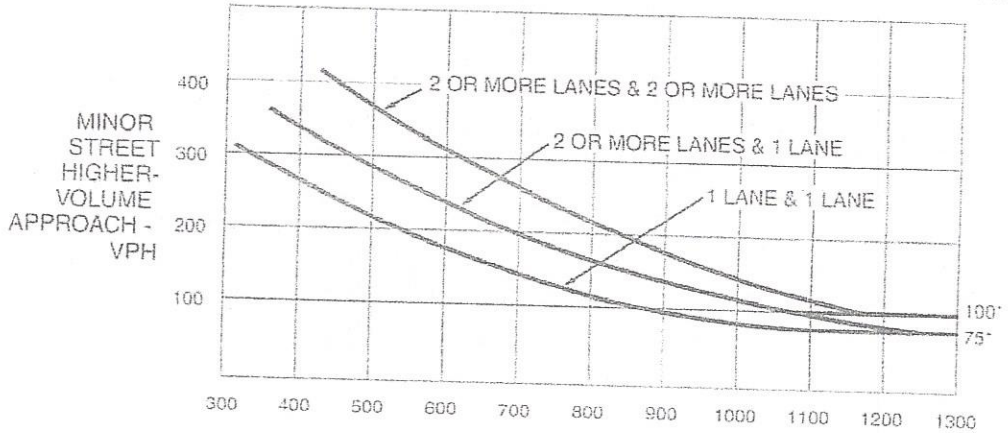
Figure 4C-3. Warrant 3, Peak Hour



*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)



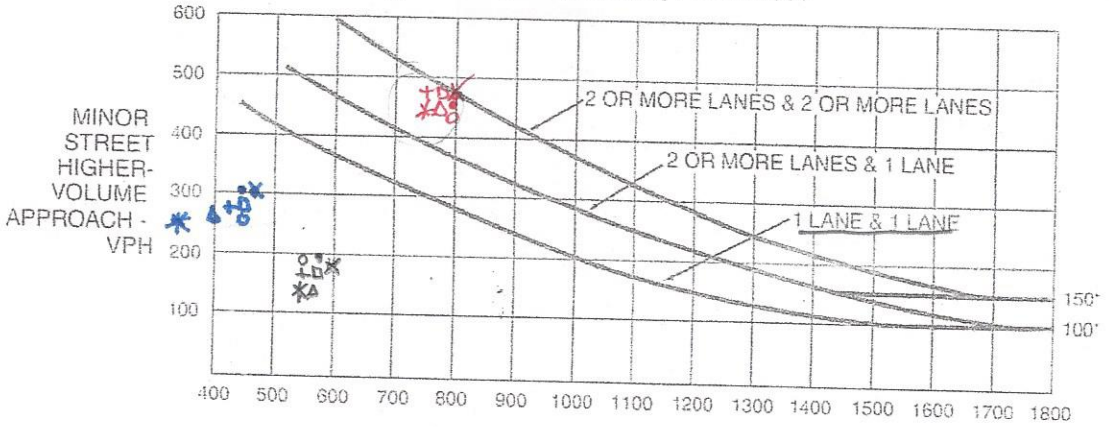
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

AM PM

EXIST
EPAP
EPAPPP CENTENNIAL
EPAPPP SR49
CUM
CUM CENTENNIAL
CUM SR49

15. BRUNSWICK/SR 174

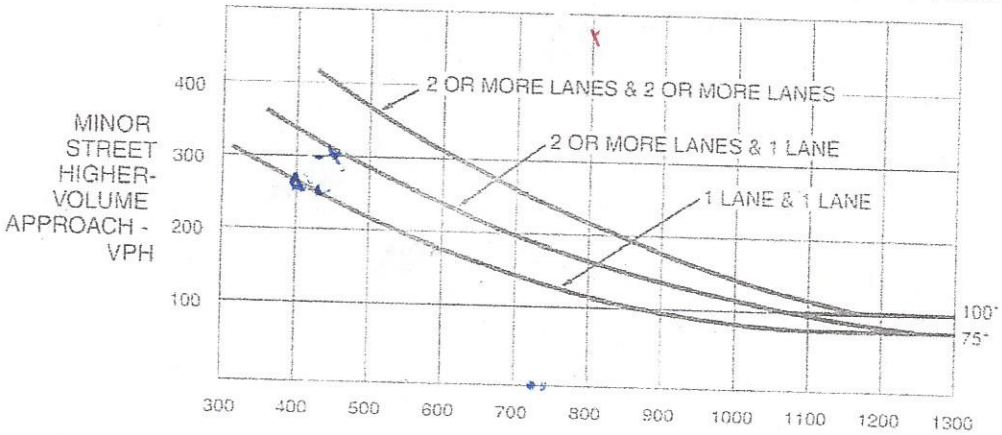
Figure 4C-3. Warrant 3, Peak Hour



*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)



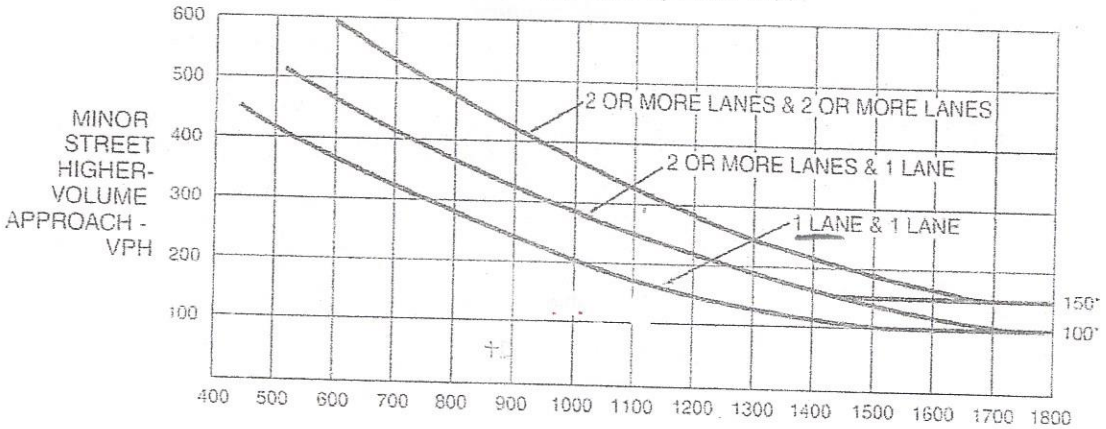
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6:30 AM 3:30 PM 6:30 PM

EXIST
EPAP
EPAPPP CENTENNIAL
EPAPPP SR49
CUM
CPP CENTENNIAL
CPP SR49

15. BRUNSWICK/SR174

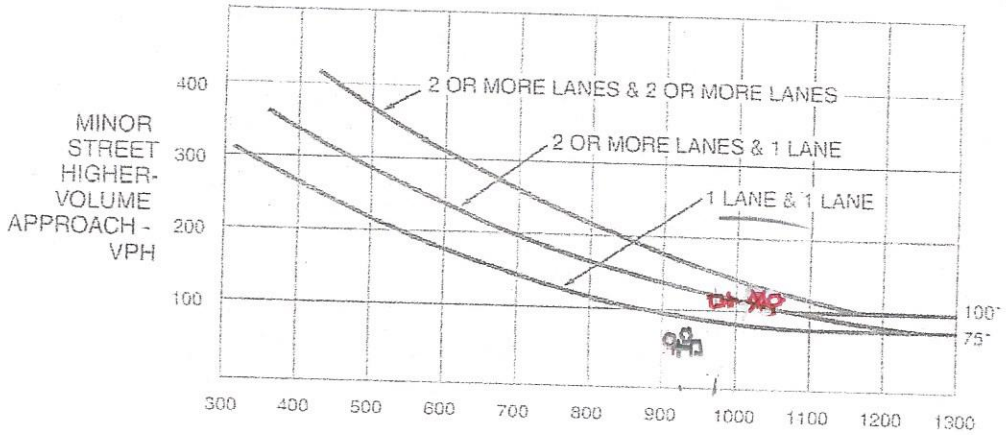
Figure 4C-3. Warrant 3, Peak Hour



*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)

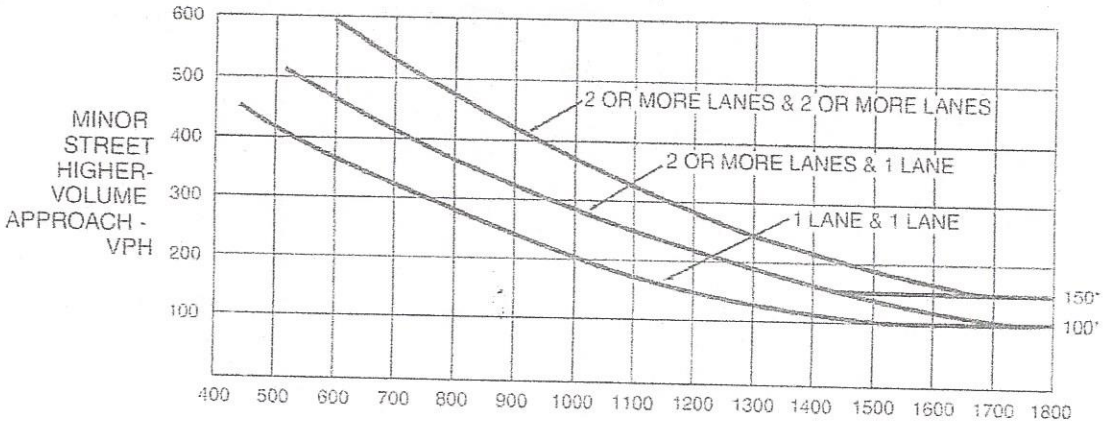


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EPAPPP CENTENNIAL	+	+
EPAPPP SR49	□	□
CPP CENT	⊠	⊠
CPP SR49	⬡	⬡

16. BRUNSWICK/ PROJ. DRIVEWAY

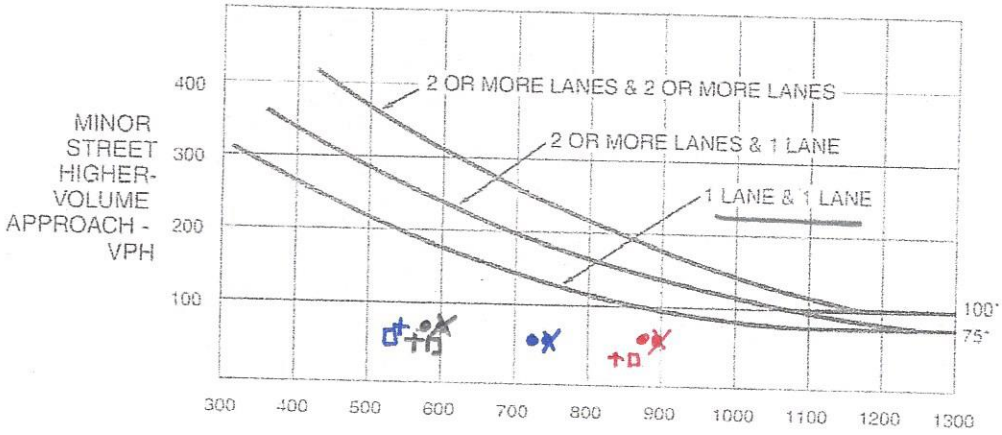
Figure 4C-3. Warrant 3, Peak Hour



*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)



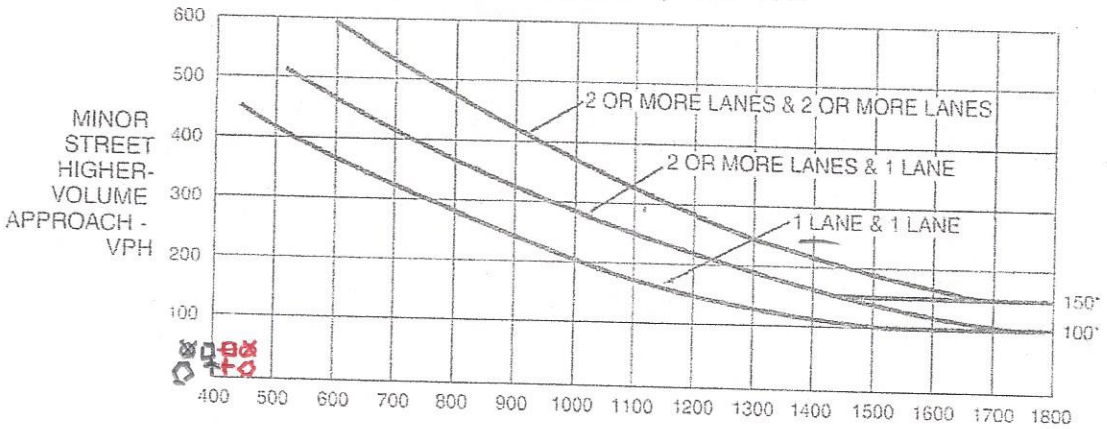
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

6:30 AM 3:30 PM 6:30 PM

EP APPP CENTENNIAL +
EP APPP SR49 □
CPP CENTENNIAL •
CPP SR49 ×

16. BRUNSWICK / DRIVEWAY

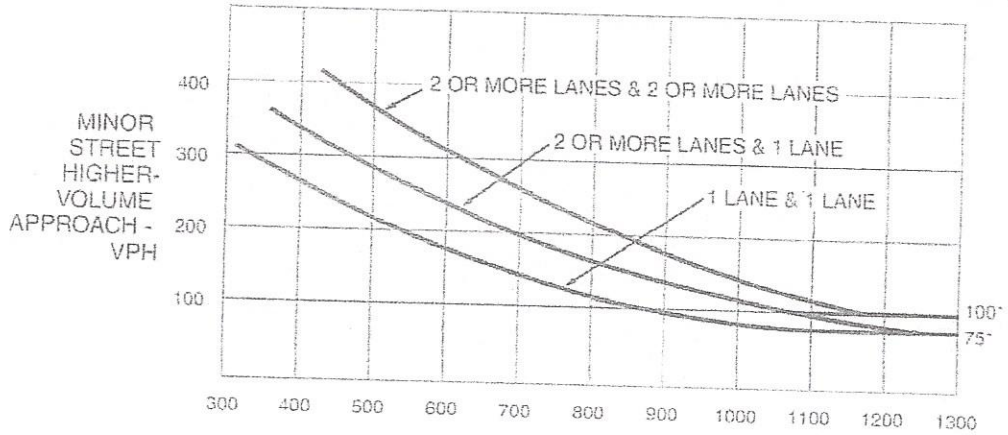
Figure 4C-3. Warrant 3, Peak Hour



*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)



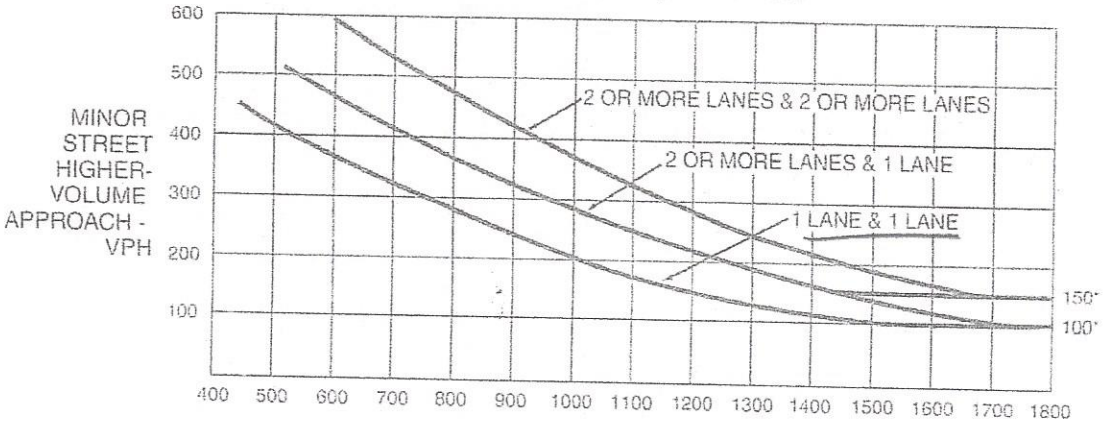
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

AM PM

EPAPPP CENTENNIAL + +
EPAPPP SR49 □ □
CPP CENT ✕ ✕
CPP SR49 ⬡ ⬡

17. E BENNETT/ PROJ. DRIVEWAY

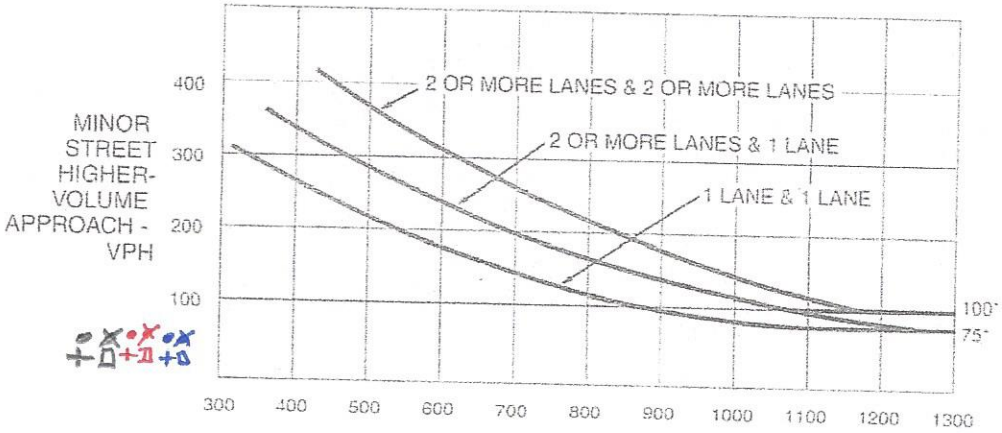
Figure 4C-3. Warrant 3, Peak Hour



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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



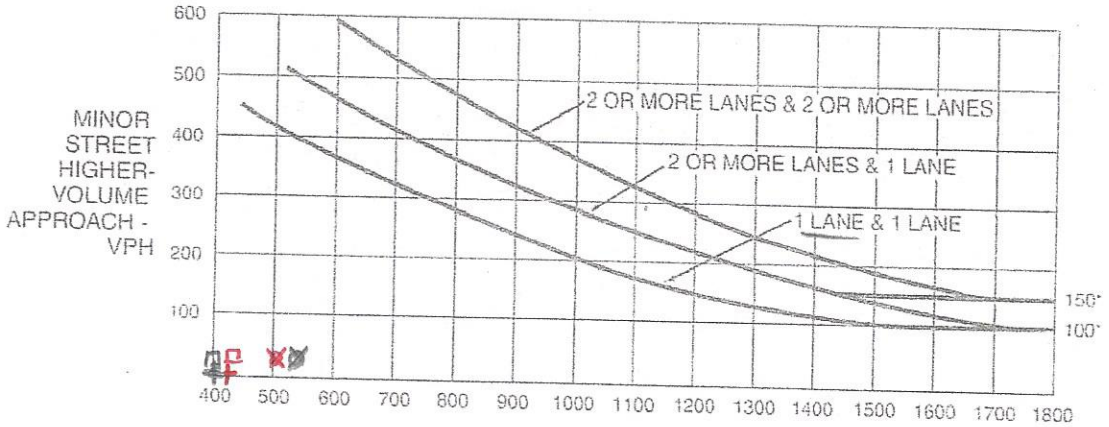
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6:30 AM 3:30 PM 6:30 PM

EPAPPP CENTENNIAL +
EPAPPP SR49 □
CPP CENTENNIAL ●
CPP SR49 ✕

17. E. BENNETT/ DRIVEWAY

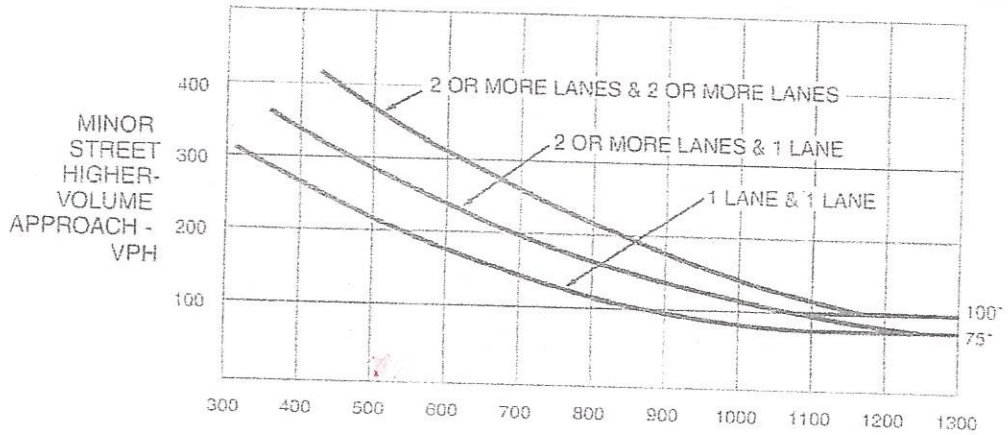
Figure 4C-3. Warrant 3, Peak Hour



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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

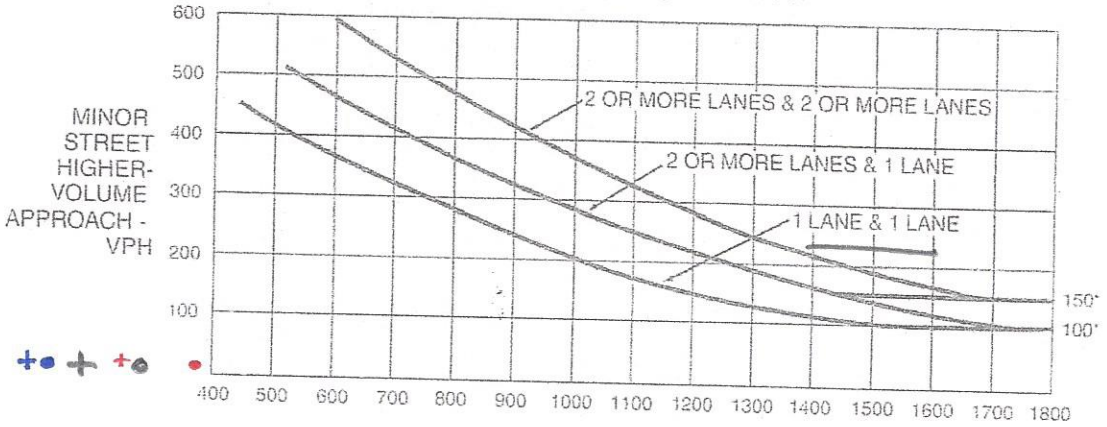


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	AM	PM
EP APPP CENT	+	+
CPP CENT	⊗	⊗

18. WHISPERING PINES/
PROJ. DRIVEWAY

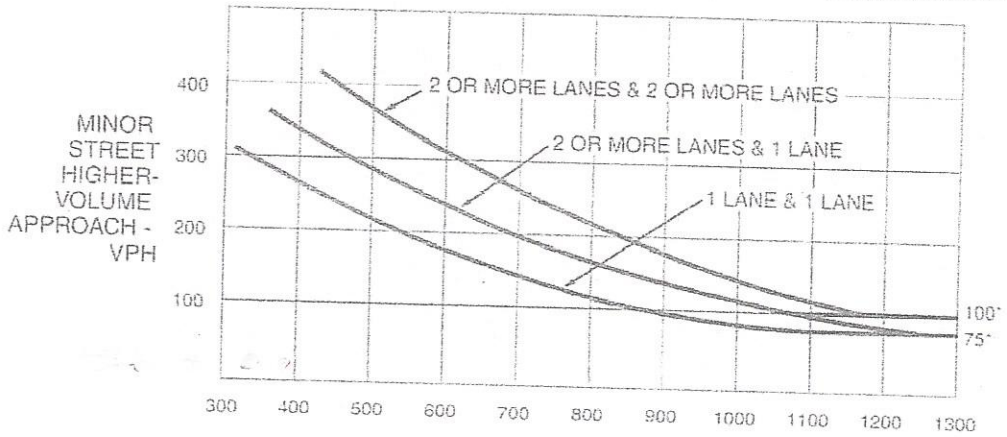
Figure 4C-3. Warrant 3, Peak Hour



*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.

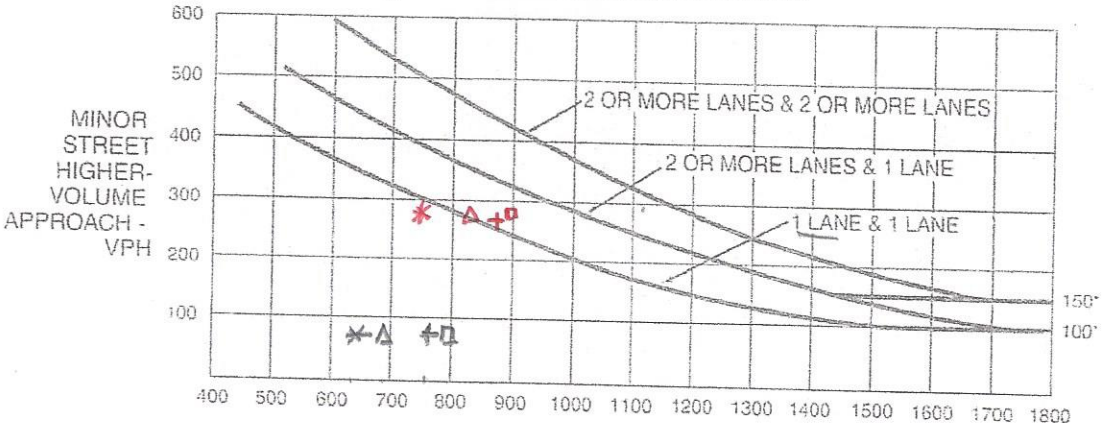
6:30 AM 3:30 PM 6:30 PM

EL APPP CENTENNIAL + + +

CPP CENTENNIAL • • •

18. WHISPERING PINES/ DRIVEWAY

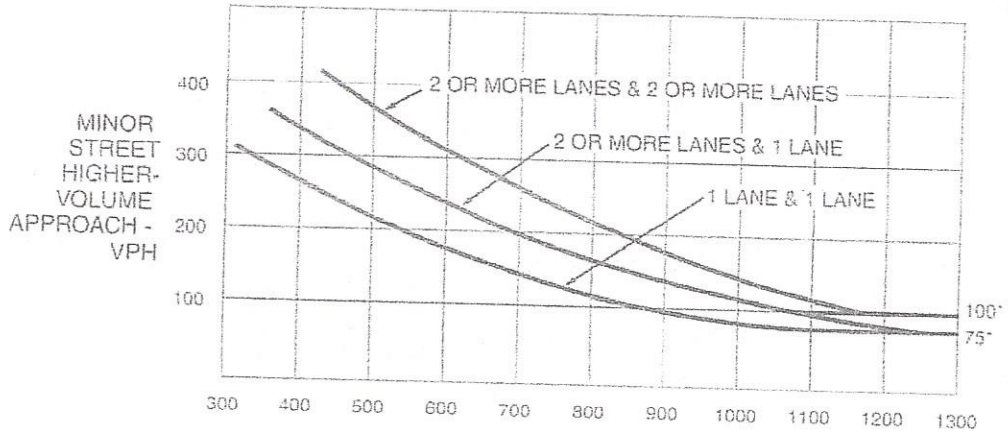
Figure 4C-3. Warrant 3, Peak Hour



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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

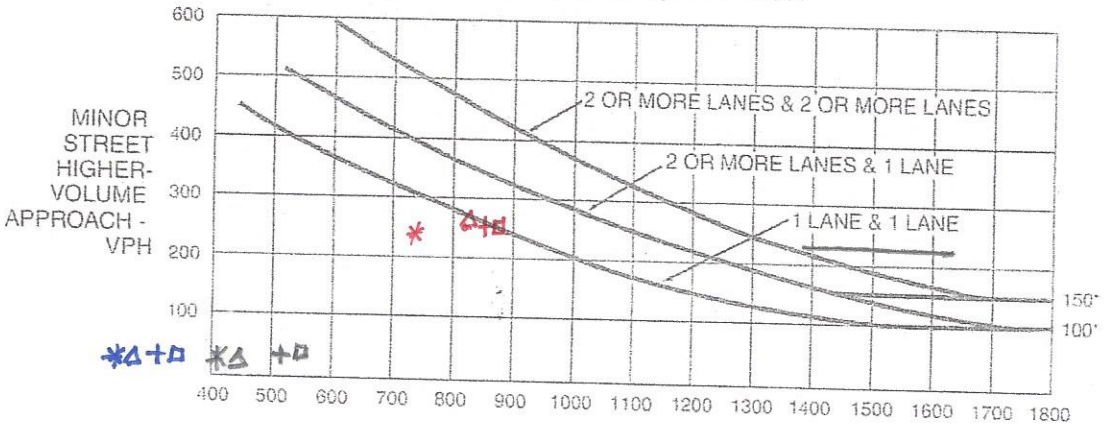


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	AM	PM
EXIST	*	*
EPAP	Δ	Δ
EPAPPP CENTENNIAL	+	+
EPAPPP SR49	□	□
CUM	– –	SIGNALIZED

19. IDAHO MARYLAND/ CENTENNIAL

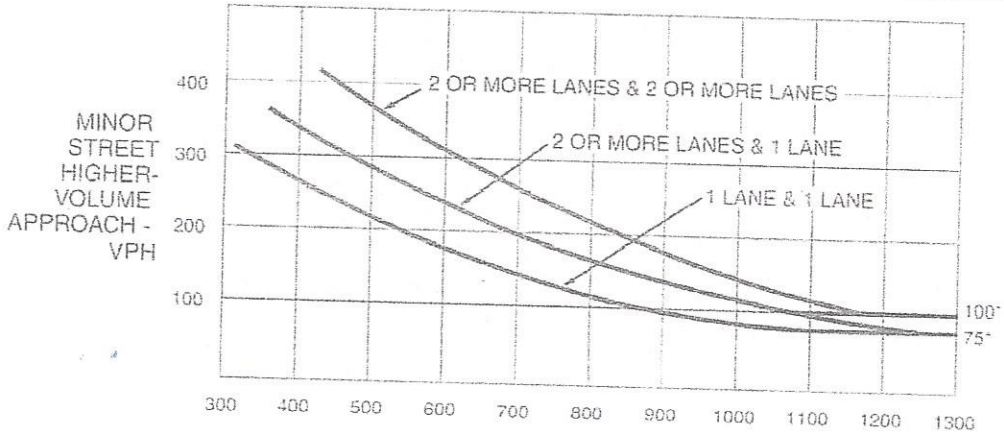
Figure 4C-3. Warrant 3, Peak Hour



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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.

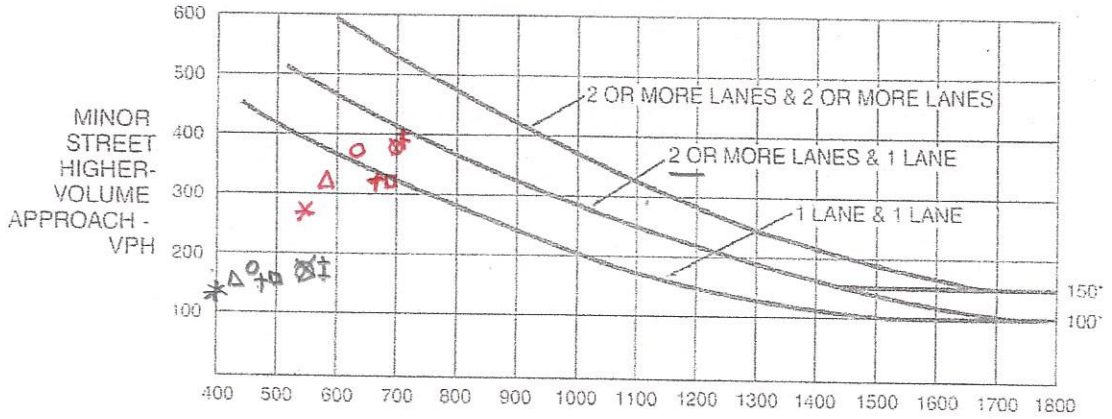
6:30 AM 3:30 PM 6:30 PM

EXIST *
EPAP △
EPAPP CENTENNIAL +
EPAPP SR49 □

CUMULATIVE - SIGNAL

19. IDAHO MARYLAND/CENTENNIAL

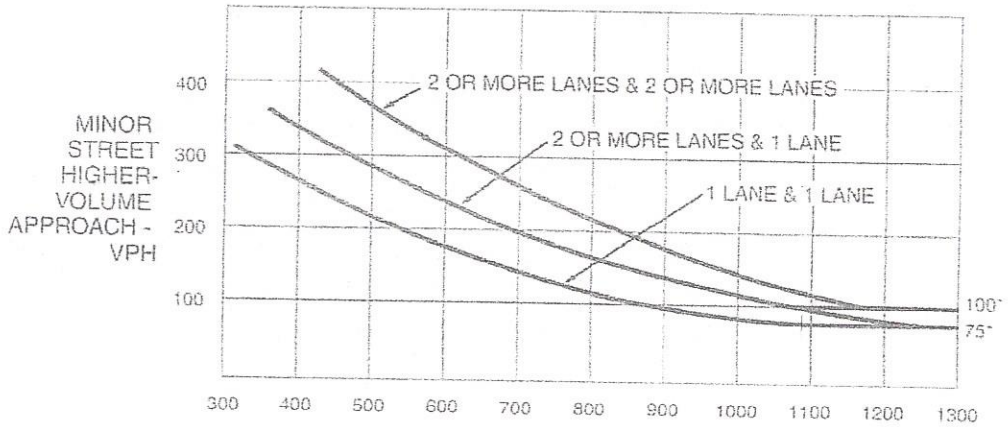
Figure 4C-3. Warrant 3, Peak Hour



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(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

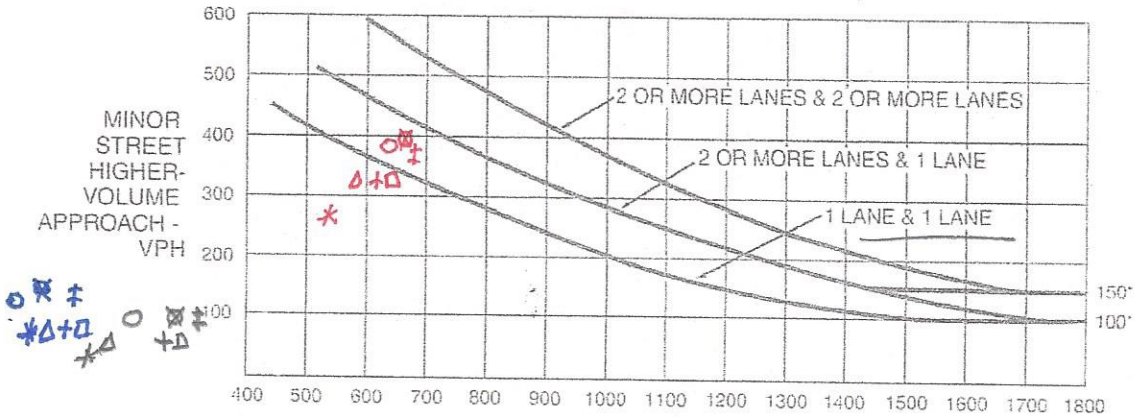


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	AM	PM
EXIST	*	*
EPAP	△	△
EPAPPP CENTENNIAL	+	+
EPAPPP SR49	□	□
CUM	○	○
CPP CENTENNIAL	⊗	⊗
CPP SR49	‡	‡

20. IDAHO MARYLAND / SUTTON
November 7, 2014

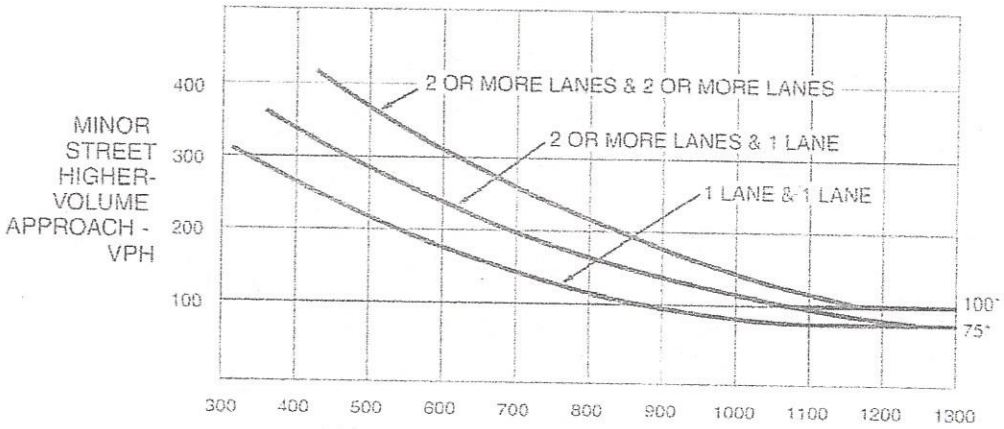
Figure 4C-3. Warrant 3, Peak Hour



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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

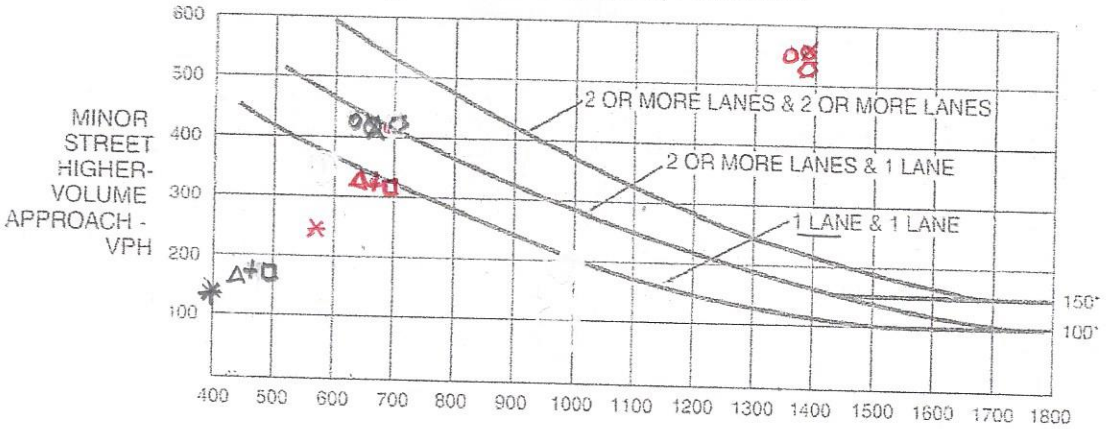


*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

	6:30 AM	3:30 PM	6:30 PM
EXIST	*	*	*
EPAP	Δ	Δ	Δ
EPAPPP CENTENNIAL	+	+	+
EPAPPP SR49	□	□	□
CUMULATIVE	○	○	○
CPP CENTENNIAL	⊗	⊗	⊗
CPP - SR49	‡	‡	‡

20. IDAHO MARYLAND / SUTTON

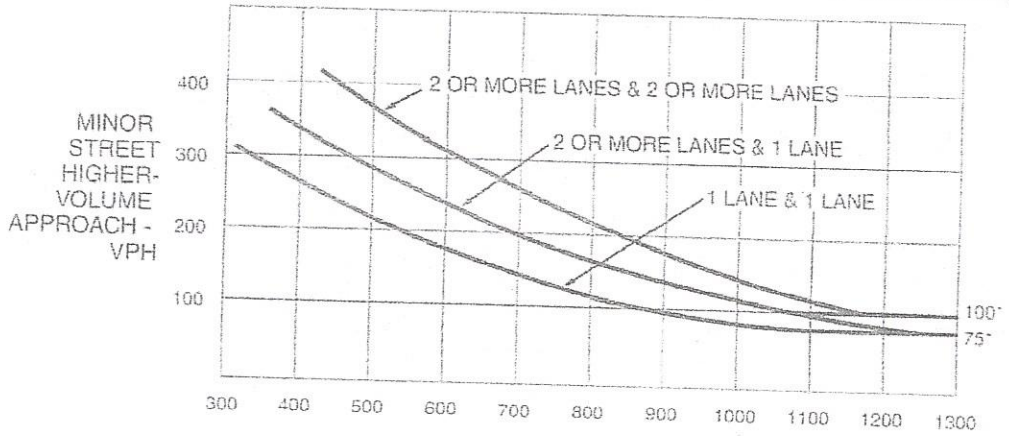
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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

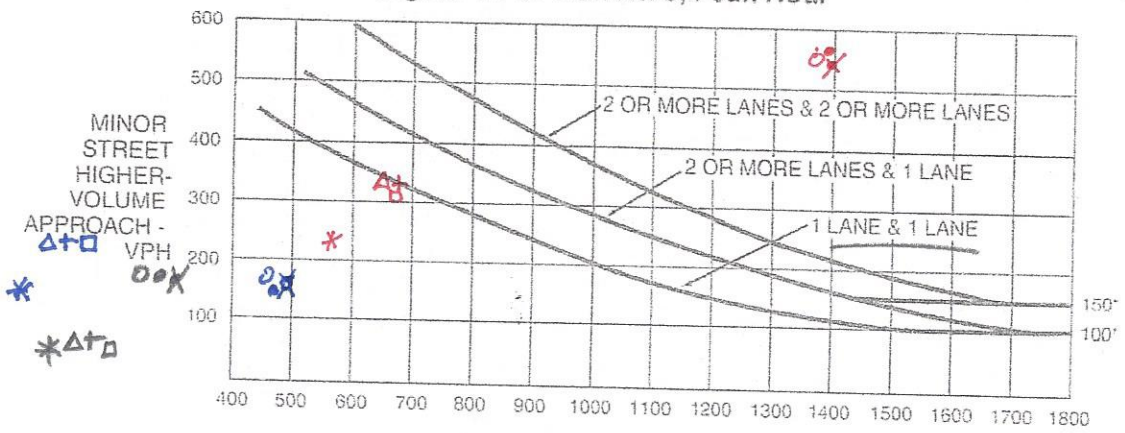


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	AM	PM
EXIST	*	*
EPAP	△	△
EPAPP CENTENNIAL	+	+
EPAPP SR49	□	□
CUM	○	○
CPP CENT	⊗	⊗
CPP SR49	⬡	⬡

21. SUTTON/DORSEY

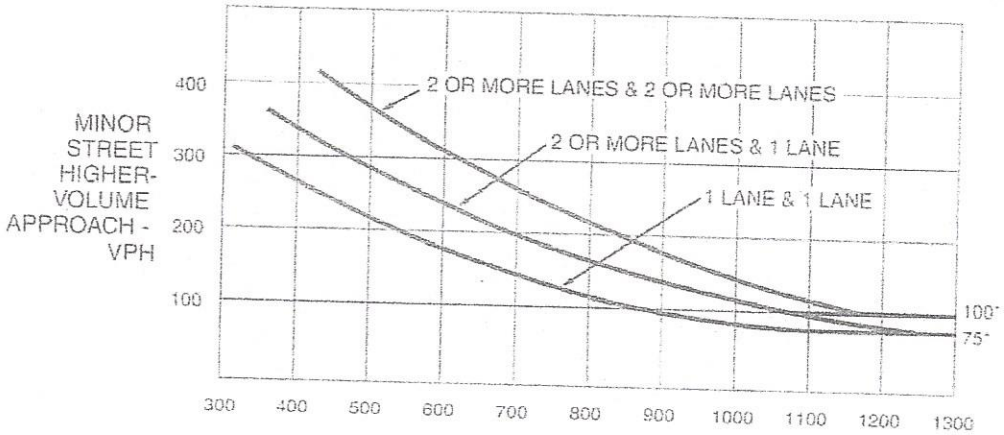
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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



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6:30 AM 3:30 PM 6:30 PM

EXIST
EPAP
EPAP CENTENNIAL
EPAP SR49
CUMULATIVE
CPP CENTENNIAL
CPP SR49

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 26, 2022

TRAFFIC INDEX CALCULATIONS

NO PROJECT CONDITIONS

PLUS PROJECT CONDITIONS (CENTENNIAL SITE)

PLUS PROJECT CONDITIONS (TO SR 49)

KDA

#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 26, 2022

PROJECT TRIP CALCULATIONS

PROJECT TRIP GENERATION

KDA

EMPLOYEE TRAFFIC

Employee Trips (Full Mine Production)				
Brunswick Site	**Incoming**	**Outgoing**		
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		
Centennial Site	**Incoming**	**Outgoing**		
7 AM shiftchange - Monday -Friday	4			
3:30 PM shift change - Monday - Friday		4		

HAUL TRAFFIC

Engineered Fill Trucking - Brunswick to Centennial			**Truck Type:**	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	**Hauling Schedule:**	24 hs per day, 7 days per week
Average daily trucking	50.0	trips per day	**Duration:**	Approx. 5 - 6 yrs
Maximum daily trucking	100.0	trips per day		
Concentrate Trucking - Brunswick to west coast port or Nevada State			**Truck Type:**	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	**Hauling Schedule:**	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

Materials & Supplys - Brunswick			* Anticipated to occur during typical business hours, weekdays.
	Average per week	**Maximum per Day**	
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.
Total	44.0	12	
Materials & Supplys - Centennial			
	Average per week	**Maximum per Day**	
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:

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3853 Taylor Road, Suite G
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(916) 660-1555



April 26, 2022

FAIR SHARE PERCENTAGES & COST

KDA

FAIR SHARE PERCENTAGES & COSTS

$$\frac{\text{Project Volumes}}{\text{(Future + Project) – EPAP (existing \& approved projects)}}$$

#11 Brunswick Rd / Sutton Way

	Scenario #1 (Centennial Site)		**Scenario #2 (SR 49)**
	$\frac{13}{3{,}425 - 3{,}100}$		$\frac{29}{3{,}441 - 3{,}100}$
3:30 – 4:30 PM		3:30 – 4:30 PM	
Fair Share Percentage:	**4.0%**		**8.5%**
Estimated Cost for Retiming:	$5,000		
Fair Share Amount:	**$200**		**$425**

#12 Brunswick Rd / Idaho-Maryland Rd

	Scenario #1 (Centennial Site)		**Scenario #2 (SR 49)**
	$\frac{35}{1{,}894 - 1{,}497}$		$\frac{51}{1{,}906 - 1{,}497}$
3:30 – 4:30 PM		3:30 – 4:30 PM	
Fair Share Percentage:	**8.8%**		**12.5%**
Estimated Cost:	$321,380 (GVTIF ‘Other Funds’)		
Fair Share Amount:	**$28,282**		**$40,173**

FAIR SHARE PERCENTAGES & COSTS (Cont.)

#15 Brunswick Rd / SR 174

	Scenario #1 (Centennial Site)		**Scenario #2 (SR 49)**
	10		10
3:30 – 4:30 PM	1,250 – 1,183	3:30 – 4:30 PM	1,250 – 1,183
Fair Share Percentage:	**14.9%**		**14.9%**

Estimated Cost: $450,000 (Conceptual Layout)

Fair Share Amount:	**$67,050**		**$67,050**

#19 Idaho-Maryland Rd / Centennial Drive

	Scenario #1 (Centennial Site)		**Scenario #2 (SR 49)**
	18		18
3:30 – 4:30 PM	1,237 – 1,098	3:30 – 4:30 PM	1,237 – 1,098
Fair Share Percentage:	**12.9%**		**12.9%**

Estimated Cost: $638,827 (GVTIF 'Other Funds')

Fair Share Amount:	**$82,409**		**$82,409**

#21 Sutton Way / Dorsey Drive

	Scenario #1 (Centennial Site)		**Scenario #2 (SR 49)**
	2		2
3:30 – 4:30 PM	1,936 – 985	3:30 – 4:30 PM	1,936 – 985
Fair Share Percentage:	**0.2%**		**0.2%**

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
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April 26, 2022

FEHR & PEERS VMT ANALYSIS
3-17-20 MEMO

FEHR PEERS DC

1003 K Street NW, Suite 209
Washington, DC 20001
202.854.2750

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

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

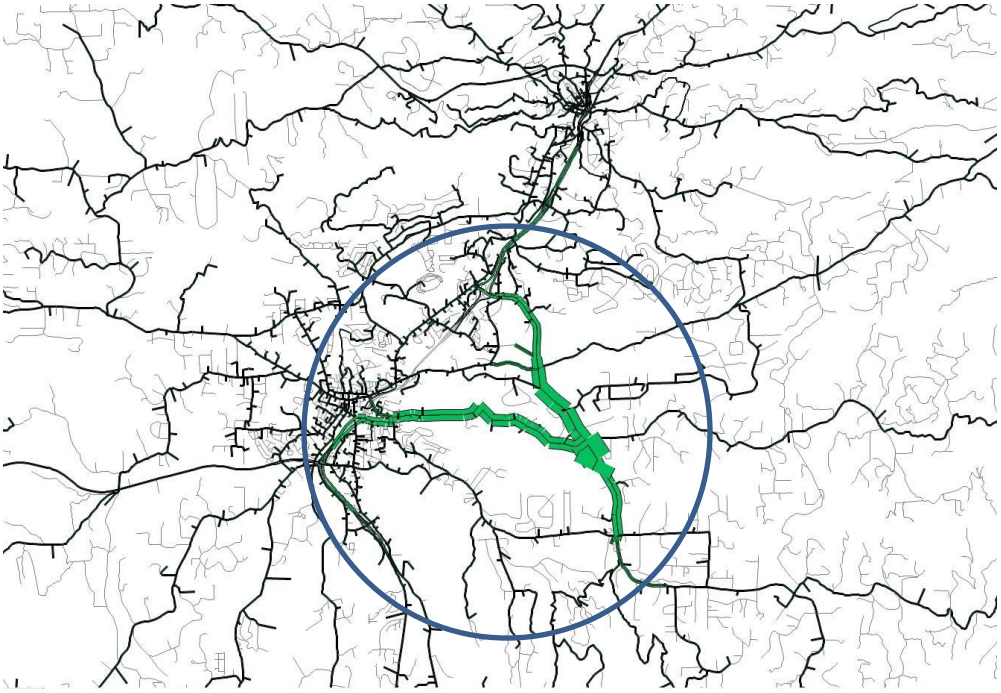
For the purposes of analyzing this mining land use project, vehicle miles traveled (VMT) was calculated by the following general equation:

$$VMT = (Avg.\ trip\ length \times Vehicle\ trips)_{Employees}$$

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.

TABLE 1: RISE GRASS VALLEY PROJECT GENERATED VMT SUMMARY

Metric	2012 Base Year	2035 Future Year
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: *Fehr & Peers, 2020*

TABLE 2: RISE GRASS VALLEY PROJECT VMT EFFECT SUMMARY

Scenario	2012 Base Year	2035 Future Year
No Project	438,990	513,575
Plus Project	439,435	513,991
Growth	445	416

Notes: VMT = vehicle miles traveled
Source: *Fehr & Peers, 2020*

Appendix O

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TECHNICAL MEMORANDUM

TO:	**Ben Mossman**	**4091**
FROM:	**Houmao Liu**	
DATE:	**17 June 2022**	
SUBJECT:	**Clarification of Modeling Components**	

INTRODUCTION

Itasca Denver, Inc. (Itasca) prepared this technical memorandum for the Rise Gold Corp (Rise) to clarify the following items in the groundwater flow model (Itasca 2020):

CONSUMPTIVE USE OF INDIVIDUAL WELLS

Consumptive water uses from individual wells are not considered in the groundwater flow model due to the lack of consumptive-use data and the fact that consumptive use is small, relative to regional groundwater flow. Because of the low permeability of the rock mass and generally low pumping rate, the drawdown of each well is localized and will not have a noticeable effect on the predicted inflow rate to the mine workings and the predicted drawdown induced by the future mining. In addition, much of the water pumped for domestic use would be recharged to groundwater by septic tanks/leach fields and landscape irrigation.

SIMULATION OF DRAINS AFTER THE CLOSURE OF HISTORICAL MINING

In the calibration of the model during recovery (1956 to 2019), mine voids were simulated with a zone of high *K* (8,000 ft/day) and high specific yield (effective porosity of 50%) for the area with drifts and raises in historical Idaho-Brunswick Mines. The drain nodes for the mine workings were turned off. The drains along Wolf Creek were simulated as drained with surveyed elevated from 2,497 ft to 2,502 ft above mean sea level (amsl) to maintain the proper groundwater flow field. The simulated recovered water level was then compared against measured groundwater levels in domestic wells in the mine area. The current flow rate from the drains was not used for the preparation or calibration of the groundwater flow model. The reasons for excluding the

calibration of the current drain rate along Wolf Creek is mainly due to the simplification of pipe flow of the upper mine working with the high *K* of porous medium. The exclusion of the calibration to the drain rates along Wolf Creek will not affect the prediction results because the groundwater flow model is calibrated to the measured water levels, based on the drain elevations along Wolf Creek.

EXCLUSION OF OTHER MINE WORKINGS

The historical Empire mines and other mines were not explicitly simulated in the model. The exclusion of these mines has no impact on the predicted inflow of the future mine workings of Rise operation for the following reasons:

1. These mines are separated from the future Rise Mine by low permeability rock without any direct hydraulic connections. Therefore, the high permeability and groundwater storages of these historical mines are localized and isolated by low permeability rock mass.

2. There is no direct flow from these historical mines to the future Rise Mine workings. Flow contributions from these historical mines to the Rise Mine is controlled by the low permeability rock masses between the historical mines and the future Rise Mine, which is judged to be similar when these historical workings are not simulated.

SIMULATION OF IDAHO FAULTS

The three main faults, Morehouse, Idaho, and 6-3 faults, discussed in the AMEC Foster Wheeler Americas Limited report (AMEC 2017) on Figures 7.8 and 7.9 of AMEC (2017) show additional faults that are part of the Idaho Fault Zone as discussed in Section 7.3.1 of AMEC's report. Figure 7-10 in AMEC (2017) shows several minor faults (22, 20, 11, and 20C) that are coincident with veins of the Brunswick veins, are already mined, and are shown not to extend towards the surface in this figure. In the groundwater flow model, the Idaho Fault system was simulated as the Idaho veins. Therefore, the modeling of these minor faults would serve no purpose because most of this area is already modelled as mining voids.

CLOSURE

Itasca appreciates the opportunity to present this memorandum to Rise Gold. Please contact us if you have any questions.

REFERENCES

AMEC. 2017. Technical Report on the Idaho-Maryland Project, Grass Valley California, USA. Report prepared by AMEC Foster Wheeler Americas Limited for Rise Gold Corp. June.

Itasca. 2020. Predictions of groundwater inflows to the underground mine workings at the Idaho-Maryland Mine. Report prepared for Rise Grass Valley Inc. by Itasca Denver, Inc. November.

Appendix P

Project No. 5279.02
July 13, 2022

Rise Grass Valley, Inc.
333 Crown Point Circle, Suite 215
Grass Valley, California 95945

Attention: Ben Mossman, President

Reference: Idaho-Maryland Mine Project

Subject: Response to Comments on Draft Environmental Impact Report

Dear Mr. Mossman:

NV5 prepared this memorandum in response to several public comments submitted on the Draft Environmental Impact Report (DEIR) for the Idaho-Maryland Mine Project (Raney Planning and Management, Inc., 2021 Dec; State Clearing House No. 2020070378) in Grass Valley, California. The responses are based on our understanding of the proposed project, and review of technical studies by others as referenced in the following sections, as well as the following NV5 technical studies:

- NV5, 2019 Nov. Geotechnical Engineering Report, Idaho-Maryland Mine Project, Brunswick Industrial Site. November 18.
- NV5, 2019 Dec. Geotechnical Engineering Report, Idaho-Maryland Mine Project, Centennial Industrial Site. December 10.
- NV5, 2020 Jan. Management Plan for Potential Seismic Hazards, Idaho-Maryland Mine Project, Portion of Brunswick Industrial Site. January 16.
- NV5, 2020 Sept. Geotechnical Assessment of Near Surface Mine Features, Idaho-Maryland Mine Project. September 11.
- NV5, 2020 Dec. Management Plan for Steep Slopes and High Erosion Potential, Idaho-Maryland Mine Project, Brunswick Industrial Site. December 21.
- NV5, 2020 Dec. Management Plan for Steep Slopes and High Erosion Potential, Idaho-Maryland Mine Project, Centennial Industrial Site. December 21.

Air Pressure and Seismicity Effects of Mine Dewatering

DEIR Appendix K, Part 2, presents a Groundwater Hydrology and Water Quality Analysis Report for the Idaho-Maryland Mine Project (Emko Environmental, Inc.; March 2020). Table 3-4 of Appendix K.2 lists water volumes in the mine workings for specific depth ranges. The upper workings (Surface to 580 Level; approximately) contain an estimated 17,878,000 gallons of water. As stated in Section 3.3.3.3 of Appendix K.2, the water level in the New Brunswick vertical shaft is approximately 257 feet below ground surface (top of the shaft collar). The total

anticipated water drop from the existing static water level to the 580 Level in the vertical shaft is therefore approximately 323 feet.

At the proposed pumping rate of 2,500 gpm, conservatively assuming no groundwater inflow into the mine, the water in the mine would drop at approximately 2.7 feet per hour. This rate of water level drop is not expected to result in significant forces related to temporary air pressure fluctuation due to the air recirculation in the mine and large frictional and volume exchange differences between water and air. In addition, increased hydrostatic (pore water) pressure has been known to increase the chances of an earthquake, as was observed in 1965 shortly after the Oroville Dam started to impound water. We estimate that site dewatering will result in a decrease in hydrostatic pressure. Therefore, we predict the mine dewatering will not cause negative effects with regard to seismicity in the project area.

Closure of East Eureka Shaft

DEIR Chapter 4.6 pertains to Geology, Soils and Mineral Resources. As required by Mitigation Measure 4.6-3(c), near surface mine features, excluding the South Idaho Shaft, are to be closed prior to initial mine dewatering:

- East Eureka Shaft
- East Eureka Drain
- Idaho Drain Tunnel
- Idaho Pump Shaft
- Idaho Shaft

As stated in the mitigation measure, the closure design shall include drainage piping for those near surface features that currently discharge groundwater. Of the features listed above, only the East Eureka Shaft currently drains water from the flooded Idaho-Maryland Mine. Proposed closure work is not to be conducted underwater or within Wolf Creek. The East Eureka Shaft is located under the existing Navo & Sons front building, approximately 50 feet away from Wolf Creek. The building foundation is approximately 5 feet higher than the flowline of Wolf Creek.

Seismic Effects of Mine Excavations and Placement of Fill on Surface

Several commenters assert that the DEIR should have evaluated the potential of the proposed project mining activities to reactivate local non-active faults and induce seismic activity due to the removal of rock and placement of fill. In our opinion, the magnitude of the mine rock excavation and the placement of excavated materials on the ground surface is relatively insignificant in comparison to the magnitude of the mass of bedrock underlying the site. Similarly, the magnitude of energy released during mining excavation is much smaller than the magnitude of energy that would be required to trigger the release of a local pre-Holocene fault. We estimate that a 5.0 earthquake releases the equivalent of 400,000 pounds of explosives released at one time compared to the reported 133 pounds per blast proposed as part of the underground mining activity for the project. Our firm has overseen many blasting projects in the Grass Valley area, most notably was the construction of the Diagnostic Center at the Sierra Nevada Hospital where hundreds of charges were detonated at the ground surface within a few hundred feet away and with no vibration disruption to hospital activities. The blasting report prepared by Precision Blasting Services, dated July 17, 2019, concluded that the anticipated

impact from drilling and blasting surrounding the proposed Idaho-Maryland Mine is negligible, and in almost all situations will be unnoticeable and undetectable by seismographs. No analysis was performed as part of NV5's study, as there is no significant potential for inducement of seismic activity from the proposed mining activity.

Sincerely,

NV5

CERTIFIED ENGINEERING GEOLOGIST
DANIEL A. VIEIRA
No. 2755
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
CHARLES R. KULL
No. 2359
GEOTECHNICAL
STATE OF CALIFORNIA

Daniel A. Vieira, C.E.G. 2755
Senior Geologist

Chuck Kull, G.E. 2359
Principal Engineer

Sent via email: PDF to Rise Gold /Attn: Ben Mossman, ceo@risegoldcorp.com

G:\1 Projects\5279 Idaho-Maryland Mine\DEIR 2022 Response to Comments\NV5 Response to DEIR Comments July 2022.docx

Appendix Q

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TECHNICAL MEMORANDUM

TO:	**Tessa Brinkman – Rise Grass Valley Inc.** **Ben Mossman – Rise Grass Valley Inc.**	**4091-19**
FROM:	**Allison Johnston** **Braden Hanna** **Houmao Liu**	
DATE:	**24 February 2020**	
SUBJECT:	**Desktop Study of Cemented Paste Backfill**	

INTRODUCTION

Rise Grass Valley Inc. (Rise) owns the Idaho-Maryland Mine (IMM), a past producing gold mine that was shut down during World War II. Rise is currently working with regulators to permit the restart of operations at the IMM. Rise has tasked Itasca Denver, Inc. (Itasca) with conducting a desktop study of cemented paste backfill (CPB) use and its potential impacts on water quality, and site-specific considerations for IMM.

CEMENTED PASTE BACKFILL OVERVIEW

Backfill methods are typically employed in mining to improve geotechnical stability by backfilling mined stopes (voids) and allow the recovery of the ore body to be maximized. CPB has several important advantages over surface disposal and other methods of mine backfilling, such as hydraulic and uncemented fills, as discussed in the following section.

CPB typically consists of tailings mixed with cement and water, although other additives or mined materials are sometimes included. The relative proportions of these components and the particle-size distributions are selected such that the mixture is dense, viscous, and does not segregate into separate liquid and solid fractions when it is transported (Verburg 2001). Typically, this requires a solids content of approximately 70% to 85% and a significant fine particle-size fraction (e.g., Potvin et al. 2005 and Zhao et al. 2019). CPB is generally formulated on the surface and delivered by pumping to where it is needed within the mine.

BENEFITS OF TAILINGS DISPOSAL BY CPB

The proper use of CPB has been documented to provide a variety of benefits relative to other tailings disposal methods such as hydraulic fill and uncemented fills (e.g., Levens et al. 1996;

Verburg 2001; MEND 2006; Schafer 2016). Some of the most significant benefits include the following:

- The introduction of neutralizing potential from the cement binder material, which can offset acid generation from sulfidic tailings materials and mine wall rock,
- The reduction of surface impacts and the total surface footprint relative to surface tailings storage facilities,
- Enhanced strength relative to uncemented backfill or conventional hydraulic fill (with or without cement),
- The reduction of the porosity and permeability of the tailings material relative to hydraulic fill, uncemented fill or no fill,
- The reduction in solute loading from the CPB relative to hydraulic fill or uncemented fill because solute transport in the low permeability CPB is limited by diffusion,
- Maximized recovery and reuse of process water, and
- Elimination of bleed water from placed backfill because of the non-draining nature of CPB.

Properly prepared CPB uses some water for cement hydration and retains the remaining water within its matrix. Being non-draining, CPB does not separate during transport or curing, does not generate high pressure on bulkheads, and does not create underground mine water handling related problems (Potvin et al. 2005).

Importantly, CPB typically reduces the mobility of chemical constituents and has additional neutralization capacity compared to uncemented tailings. During the cement hydration process, calcium silicate hydrates form, and subsequently fill pore space, which creates adherence between particles. The associated reduction in porosity and permeability results in increased retention of water and reduced permeability to air (Levens et al. 1996; Schafer 2014). The lower air permeability results in lower rates of sulfide oxidation. Because sulfide oxidation is the primary source of acidity from mined materials, lower rates of sulfide oxidation result in reduced releases of acidity and other solutes, such as metals, which tend to be much more soluble under acidic conditions (Levens et al. 1996). Additionally, sulfide oxidation and solute release reactions occur on the surface interface of minerals, so the reduction of mineral surface areas that are exposed to air and water also helps to reduce solute releases compared to unamended tailings. Previous geochemical testing on CPB samples from Leeville Mine in northern Nevada showed that metal release from intact CPB samples was controlled by diffusion, a much slower mechanism for solute transport than advection (Schafer 2014).

POTENTIAL WATER-QUALITY ISSUES WITH CPB

There are some potential water-quality related issues with CPB if it is not implemented correctly. Negative water-quality impacts from CPB are generally related to the specific composition of the tailings materials used in the CPB and/or to CPB that does not set properly or is not strong enough

to remain intact in the mine environment. A variety of site-specific factors can affect the ability of CPB to set and its long-term strength. For example, insufficient binder content, excessive water content, or water with high sulfate concentrations (e.g., from high-sulfide tailings) can decrease CPB strength or inhibit proper setting. If CPB does not set properly, it may be less effective at reducing the mobility of chemical constituents, and there is the potential for the binder material to be leached from the CPB mixture. Additionally, high sulfide-content tailings that are acid generating and have elevated metals concentrations can result in metals leaching from CPB and can degrade CPB strength.

Because cements and grouts are alkaline in nature, some studies have noted that the potential exists for these materials to preferentially leach from CPB and cause elevated pH values in groundwater and/or release constituents from the cement or other additives (MEND 2006). This could potentially increase the mobility of some constituents relative to circumneutral conditions. However, the exterior portion of CPB material typically undergoes carbonation reactions that adsorb atmospheric carbon dioxide to form calcite and replace calcium-silicate hydrates (Schafer 2014). The release of alkalinity and other constituents from CPB is generally limited by diffusion because of the low permeability of the CPB and the accumulation of these less reactive minerals on the outer CPB surface. For these reasons, leach tests for diffusive release that utilize intact CPB, rather than crushed samples, provide the most realistic measure of the release of alkalinity and other constituents from CPB (Schafer 2016). These tests typically indicate that cured CPB is not likely to result in notably elevated downgradient groundwater pH values.

The presence of chromium in cement has been identified as a potential water-quality concern related to the use of CPB (Hamberg et al. 2018). Hexavalent chromium (Cr[VI]) is an oxidized form of chromium that is more soluble and mobile in the environment than reduced forms of chromium. Notably less Cr(VI) leaches from cured cement than from unhydrated cement; Estokova et al. (2018) demonstrated that less than 0.5% of total chromium leached from a range of cured cement composites compared to 0.8% to 1.8% of total chromium from the Portland cement binder itself. Thus, selecting a supplier with low Cr(VI) content cement and ensuring the CPB is not inundated before it sets can minimize the potential for issues with Cr(VI) leaching.

IMM CPB PLAN

Itasca understands that Rise is evaluating the engineering and economic aspects associated with key factors of their ultimate CPB mixture. Rise has indicated that they plan to use a mixture that contains 15% water by weight and to use tailings with a particle-size distribution that is similar to the one used historically at the IMM, in which approximately 11% of the material passed a 44-micron screen. At this time, the cemented backfill material to be used in the IMM is anticipated to have rheological and hydrological characteristics that are suitable for typical use as CPB.

The process Rise plans for handling mined material and processing ore is outlined in Figure 1. The mined material will be separated into ore and waste rock. The ore will be crushed and then will undergo gravity separation to remove particulate gold. The gravity separation will yield fine-

grained ore material called cleaner concentrate, intermediate grain size tailings called middlings or cleaner tailings, and tailings of a larger grain size called rougher tailings (Figure 1). The cleaner tailings and rougher tailings then both undergo bulk sulfide flotation. The bulk sulfide flotation process is designed to separate the gold and associated sulfides from the rest of the tailing materials. The bulk sulfide flotation yields rougher concentrate and flotation tailings (Figure 1). The cleaner concentrate and rougher concentrate are both shipped offsite for further processing and gold recovery. The CPB used in the IMM will be composed of flotation tailings (tailings that have had ore concentrate, sulfide, and trace metals removed by flotation), Portland cement as the binder material, and water. The final formulation of the CPB, including the precise binder amount, binder source, and water content, will ultimately be defined based on rheology and strength characterization testing. This testing program will ensure that the IMM CPB is formulated to set properly and will have sufficient strength for the intended applications within the mine. Rise does not plan to use waste rock, concentrate, or other binders/additives in the IMM CPB.

IMM METALURGICAL AND GEOCHEMICAL TESTING

Rise conducted tests of metallurgical processes on aliquots of a large bulk 47-kilogram composite sample of mineralized drill core from 72 intervals in nine different boreholes (McClelland Laboratories, Inc. [MLI] 2020). That metallurgical testing generated sample materials that were representative of the IMM flotation tailings that are proposed for use in the IMM CPB. Environmental testing was conducted on the resulting representative flotation tailings samples generated from the metallurgical testing.

The metallurgical tests included gravity separation and bulk sulfide flotation procedures, designed to simulate the processes Rise plans to use on their ore (Figure 1). Gravity separation procedures were conducted on three aliquots (G-1 to G-3, Table 1) of the larger bulk ore sample to evaluate the effects of the particle size on gold recovery.

Bulk sulfide flotation procedures were conducted on the combined cleaner tailings and rougher tailings from the gravity separation procedures. Four flotation samples were prepared from those gravity separation tailings, listed in Table 1. The samples F-2, F-3, F-4 represented the particle sizes used in the gravity separation procedures. A portion of the gravity tailings sample G-1 was further ground to create an additional flotation test sample with a smaller particle size, referred to as sample F-1. Each of the flotation samples was subjected to the proposed flotation recovery process, which yields flotation tailings and rougher concentrate (Figure 1).

Sulfide sulfur was analyzed for the unprocessed bulk composite material as well as the flotation tailings generated from each of the four flotation procedures. As listed in Table 1, the unprocessed sample contained 1.6% sulfide sulfur, whereas the flotation tailings samples contained approximately 0.06 to 0.12% sulfide sulfur; the sulfide sulfur recovery was approximately 93 to 96%. Thus, only a trace amount of sulfide sulfur remains in the flotation tailings, effectively eliminating potential water quality issues associated with the use of high-

sulfide tailings in CPB. The gold recovery from the combined gravity separation and flotation procedures was high, ranging from 95 to 98% (Table 1), indicating that the ore processing procedures were effective. Both the sulfide sulfur and gold recovery increased with decreasing particle size over the range used in the flotation procedures.

Additional environmental testing was conducted by ACZ Laboratories (ACZ) on the flotation tailings samples. Modified acid-base accounting (ABA) analysis including paste pH, detailed sulfur speciation, and a titration-based estimate of the sample acid-neutralization potential (ANP) was conducted on each flotation tailings sample (ACZ 2020). As listed in Table 2, the ABA analysis showed that all four samples were net acid-neutralizing, with low acid-generation potential (AGP) due to low sulfur contents and elevated ANP values of approximately 200 tons calcium carbonate equivalents per kiloton (t $CaCO_3$/kt).

The solid-phase composition of each of the four flotation tailings samples was also analyzed using a strong-acid digestion (EPA 1996) conducted by ACZ. This method is not intended to be a total digestion; however, it is a very strong acid digestion that will dissolve almost all elements that could potentially become environmentally available (EPA 1996). The results of the solid-phase composition analyses are listed in Table 3 (ACZ 2019). The solid-phase concentrations are similar to (less than ten times) the average crustal abundance for elements such as antimony, arsenic, cadmium, copper, nickel, thallium, vanadium, and zinc, which are commonly associated with low-sulfide gold mineralization, further indicating that the flotation process effectively removed trace metals associated with the sulfide minerals. Molybdenum was the only trace metal that was detected at an average concentration in the flotation tailings that was more than ten times the average crustal abundance.

A waste extraction test modified to use deionized water as the lixiviant (WET-DI) was also conducted on each of the four flotation tailings samples. The results are listed in Table 4. The primary maximum contaminant levels (MCLs) for drinking water in California are also listed in Table 4. As shown in Table 4, the WET-DI concentrations are less than the primary MCLs for all flotation tailings samples. Although molybdenum was somewhat elevated in the solid-phase composition of the tailings relative to the average crustal abundance, molybdenum did not leach from the tailings in the WET-DI tests. All of the flotation tailings leachate samples had molybdenum concentrations that were below the detection limit of 0.02 milligrams per liter (mg/L).

Based on the testing results described herein, IMM flotation tailings have low sulfide content, are net acid-neutralizing, have solid-phase metals contents that are comparable to the average crustal abundances, and have leachate concentrations from WET-DI tests that meet all California primary MCLs. Thus, it is likely that the CPB used in the IMM will have very low solute release rates and will be generally environmentally benign. Because of the low sulfide content of the flotation tailings, IMM CPB is anticipated to have good long-term strength as long as sufficient binder material is used. The proposed strength characterization testing will provide the necessary

information regarding the required amount of binder. Additionally, the CPB will be placed while the mine is dewatered, so the CPB will cure before it is inundated by groundwater.

If the IMM ore-processing methods change substantially, additional geochemical testing of flotation tailings may be necessary to confirm that these results are still applicable. Additionally, Rise plans to conduct geochemical testing using the final CPB formulation once a specific Portland cement source has been selected, in order to confirm that no constituents (e.g., pH values or chromium) release at levels of concern from the final selected CPB formulation as a result of the binder composition or the interaction between the binder and the tailings material.

CONCLUSIONS

Based on the discussion provided above, the use of CPB is an environmentally favorable disposal alternative for tailings because, when used properly, it significantly limits solute release, and reduces the surface footprint of the mine and associated environmental impacts. However, it is clear from case studies and theoretical behavior of CPB that there are a variety of site-specific factors that could affect the potential for water-quality impacts. Some important factors to consider in designing and using CPB include the following:

- Selecting an appropriate amount and type of binder material through geochemical and geotechnical testing, paying particular attention to the strength of the cured CPB;
- Geochemical testing of both the tailings that will be used in the CPB and the intact, cured CPB material itself;
- Preventing inundation of CPB before it is cured;
- Preventing contact of CPB with acidic water (especially before it is cured); and
- Minimizing the amount of contact time of cured CPB with atmospheric oxygen.

Each of these factors described above are addressed by Rise's proposed CPB plan and available characterization testing. Based on the currently available site-specific information, Itasca anticipates that the CPB mixture developed using flotation tailings from the IMM will be relatively inert due to the low sulfide and metals content of the flotation tailings.

Itasca understands that Rise plans to complete more extensive strength, rheological, and geochemical testing on their ultimate CPB mixture at a later stage in the IMM project. Prior to placement of CPB in the mine, engineering evaluation of the proper cement to tailings ratios will be conducted, and batch testing of those mixtures will be performed to determine the actual concentrations of constituents that may be present in any leachate from the CPB.

Based on the available data, the use at IMM of the CPB composed of flotation tailings, Portland cement, and water is anticipated to optimize water quality relative to surface tailings disposal, other fill methods (e.g., hydraulic fill or sand fill), and no backfill. The CPB will contribute

additional net neutralization potential to the backfilled areas and is not anticipated to negatively affect groundwater as a result of solute leaching because of the low metals content, low sulfide content, and net-neutralizing character of the IMM CPB materials.

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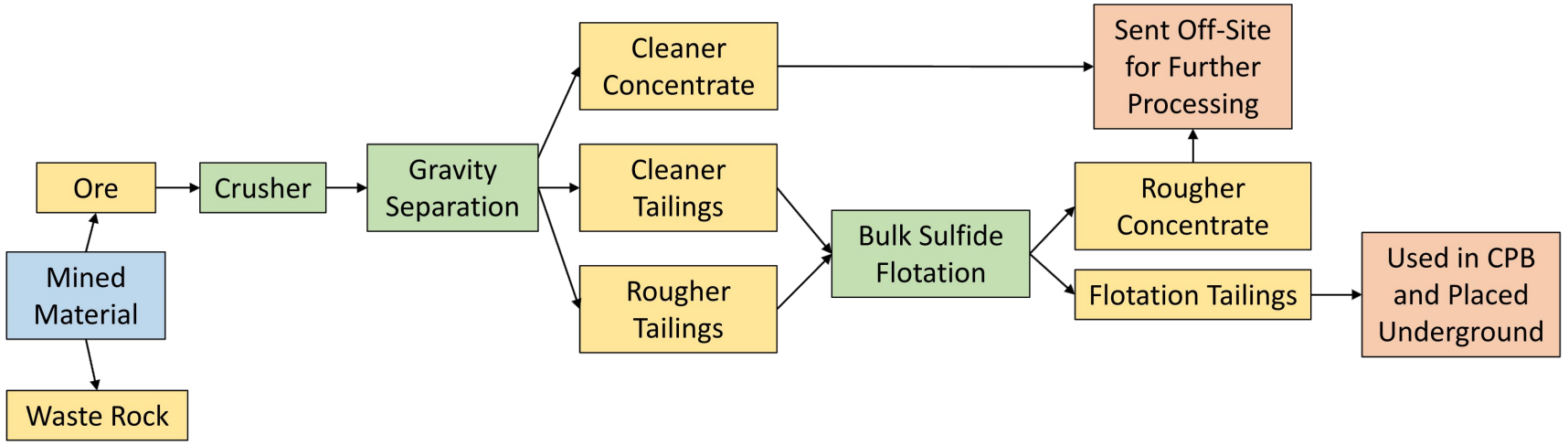
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Attachments: Figure 1 – Flow Chart Illustrating Ore Processing
Table 1 – Bulk Composite and Flotation Tailings Sulfide Content and Recovery
Table 2 – Acid-Base Accounting Results for Flotation Tailings
Table 3 – Solid-Phase Composition of Flotation Tailings
Table 4 – WET-DI Leachate Concentrations for Flotation Tailings



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BY	AJJ
CHECKED	BTH
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DRAWING DATE	10 JAN 2020
REVISION DATE	

ITASCA™ Denver, Inc.

Flow Chart Illustrating Ore Processing

CLIENT: Rise Grass Valley Inc.

FIGURE NO. 1

TABLE 1

Bulk Composite and Flotation Tailings Sulfide Content and Recovery

Material		Particle Size[1]	Sulfide Sulfur[2] (%S)	Sulfide Sulfur Recovery (%)	Total Gold Recovery (%)
Gravity Separation Sample	Flotation Test Sample				
Bulk Composite Ore Sample		--	1.60	--	--
G-1	F-1	80%-75µm (gravity tailings from 80%-180µm that were re-ground)	0.06	96.3	97.9
	F-2	80%-180µm[3]	0.06	96.2	97.2
G-2	F-3	80%-300µm[3]	0.12	92.9	94.8
G-3	F-4	80%-212µm[3]	0.10	93.9	96.0

Notes:

1. A particle size of 80%-75µm indicates that 80% of the sample passes a 75 micrometer filter.
2. The sulfide sulfur content listed in this table was measured as part of gold and silver assay. The sulfide sulfur for the flotation test samples refers to the sulfide sulfur content of the flotation tailings.
3. Sample subject to short polish grind prior to flotation test to create fresh sulfide mineral surfaces before the bulk sulfide flotation procedure (MLI 2019), and therefore approximated the particle size distributions from the gravity separation process.

TABLE 2

Acid-Base Accounting Results for Flotation Tailings

Sample	Paste pH	Total Sulfur	Hot Water Extractable	HCl Extractable	HNO_3 Extractable	Residual Sulfur	AGP[2]	ANP[3]	Net Neutralization Potential (ANP - AGP)	Neutralization Potential Ratio (ANP/AGP)
Units	**su**	**%S**					**t $CaCO_3$/kt**			**unitless**
F-1[1]	8.6	0.04	<0.01	<0.01	0.04	<0.01	1.25	199	198	159
F-2[1]	8.3	0.05	0.01	<0.01	0.01	<0.01	1.56	194	192	124
F-3	8.9	0.06	<0.01	<0.01	0.06	<0.01	1.88	204	202	109
F-4	8.7	0.06	0.01	<0.01	0.05	<0.01	1.88	189	187	101

Notes:

1. Additional ABA testing was conducted on these samples by MLI, as reported in MLI (2019).

2. AGP calculated based on total sulfur content (i.e., %S x 31.25).

3. ANP determined by titration as per Nevada Modified Sobek ABA procedure (i.e., NDEP 2015).

TABLE 3

Solid-Phase Composition of Flotation Tailings

Parameter (mg/kg)	Units	Average Crustal Abundance[1]	F-1[2]	F-2[2]	F-3	F-4
Aluminum	mg/kg	83,600	16,100	16,300	16,300	16,300
Antimony	mg/kg	0.2	0.2	<0.2	<0.2	<0.2
Arsenic	mg/kg	1.8	1.7	1.4	2.0	1.2
Barium	mg/kg	390	18.4	16.6	17.9	17.6
Beryllium	mg/kg	2	0.23	0.22	0.22	0.22
Boron	mg/kg	9	<2	<2	<2	<2
Cadmium	mg/kg	0.16	0.61	0.62	0.62	0.59
Chromium	mg/kg	122	73	75	88	88
Cobalt	mg/kg	29	13	13	13	13
Copper	mg/kg	68	86	86	87	84
Iron	mg/kg	62,200	35,500	36,000	35,200	35,200
Lead	mg/kg	13	11.8	9.34	10.2	8.88
Manganese	mg/kg	1,060	1000	1010	990	994
Molybdenum	mg/kg	1.2	22	33	42	37
Nickel	mg/kg	99	31.1	31.5	30.3	29.9
Selenium	mg/kg	0.05	0.11	0.12	0.13	0.11
Silver	mg/kg	0.08	0.23	0.21	0.23	0.2
Thallium	mg/kg	0.72	<0.05	<0.05	<0.05	<0.05
Vanadium	mg/kg	136	72.0	73.2	73.4	73.0
Zinc	mg/kg	76	65	63	63	63
Mercury by Direct Combustion AA	ng/g	86	39.9	45.1	41.9	71.3

Notes:

1. Source: Price (1997).
2. Additional solid-phase chemical composition extractions and analysis were performed by Western Environmental Testing Laboratory and are provided in MLI (2019). Quality control results indicate consistently lower practical quantitation limits in the ACZ analyses, suggesting more reliable measurements. Thus, the ACZ analyses are presented here.

TABLE 4

WET-DI Leachate Concentrations for Flotation Tailings

Parameter	Units	California Primary MCLs[1]	California Secondary MCLs[4]	F-1	F-2	F-3	F-4
Aluminum	mg/L	1	0.2	0.17	0.18	0.26	0.28
Antimony	mg/L	0.006		0.0015	0.0015	0.0031	0.0020
Arsenic	mg/L	0.01		0.0018	0.0013	0.0019	0.0014
Barium	mg/L	1		<0.007	<0.007	<0.007	<0.007
Beryllium	mg/L	0.004		<0.00008	<0.00008	<0.00008	<0.00008
Boron	mg/L			<0.02	<0.02	<0.02	<0.02
Cadmium	mg/L	0.005		<0.00005	<0.00005	<0.00005	<0.00005
Calcium	mg/L			9.0	8.5	7.5	8.3
Chloride	mg/L		500[5]	1.7	1.9	2.8	2.5
Chromium	mg/L	0.05		<0.01	<0.01	<0.01	<0.01
Cobalt	mg/L			<0.01	<0.01	<0.01	<0.01
Conductivity at 25°C	umhos/cm		1,600[5]	105	100	115	118
Copper	mg/L	1.3[2]	1.0	<0.01	0.01	0.02	0.09
Fluoride	mg/L	2		<0.1	<0.1	<0.1	<0.1
Hardness as $CaCO_3$	mg/L			38	36	33	36
Iron	mg/L		0.3	<0.03	<0.03	<0.03	<0.03
Lead	mg/L	0.015[2]		<0.0001	<0.0001	<0.0001	<0.0001
Magnesium	mg/L			3.8	3.5	3.5	3.8
Manganese	mg/L		0.05	<0.01	<0.01	<0.01	<0.01
Mercury	mg/L	0.002		<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum	mg/L			<0.02	<0.02	<0.02	<0.02
Nickel	mg/L	0.1		<0.008	<0.008	<0.008	<0.008
Nitrate	mg/L	45[3]		0.03	0.05	0.22	0.19
Nitrate/Nitrite as N	mg/L	10		0.06	0.08	0.28	0.24
Nitrite as N	mg/L	1		0.03	0.03	0.06	0.05
Potassium	mg/L			3.8	4.2	7.8	7.4
Residue, Filterable (TDS) @180C	mg/L		1,000[5]	64	72	78	78
Selenium	mg/L	0.05		0.0003	0.0002	0.0003	0.0003
Silver	mg/L		0.1	0.0001	<0.0001	<0.0001	<0.0001
Sodium	mg/L			3.7	3.6	5.1	4.7
Sulfate	mg/L		500[5]	8.4	6.3	8.5	8.7
Thallium	mg/L	0.002		<0.0001	<0.0001	0.0003	0.0001
Vanadium	mg/L			0.008	0.010	0.018	0.014
Zinc	mg/L		5.0	<0.01	<0.01	<0.01	<0.01
Bicarbonate as $CaCO_3$	mg/L			40.7	40.2	43.5	44.6
Carbonate as $CaCO_3$	mg/L			4.5	3.2	2.6	3.1
Hydroxide as $CaCO_3$	mg/L			<2	<2	<2	<2
pH	su		6.5 - 8.5[6]	9.4	9.3	9.3	9.3
Total Alkalinity	mg/L			45.2	43.4	46.1	47.7

Notes:

1. California primary MCLs listed as per California Waterboard (2018a). Additional types of standards exist such as secondary MCLs and public health goals.
2. Action levels for copper and lead as per California Waterboard (2019).
3. Concentration is in units of mg/L nitrate as NO_3.
4. Secondary MCLs listed as per California Waterboard (2018b).
5. Upper bound of secondary MCL range (California Waterboard 2018b).
6. U.S. EPA secondary MCL (EPA 2020).

Appendix R

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MEMORANDUM

To:	Ben Mossman, Rise Grass Valley Inc.
From:	Matthew Morales, Dudek
Subject:	Health Risk Assessment Memorandum for the Idaho-Maryland Mine Project – Hexavalent Chromium and Nitrogen Dioxide
Date:	December 8, 2022
cc:	Adam Poll, Dudek
Attachment:	

The purpose of this Health Risk Assessment (HRA) memorandum is to address the potential health risk associated with exposure to two additional toxic air contaminants (TACs) that were not included in the original analysis of the proposed Idaho-Maryland Mine Project (project), namely, hexavalent chromium in cement and nitrogen dioxide (NO_2) from the combustion of ammonium nitrate fuel oil (ANFO). This memorandum summarizes the revised results from including these TACs in the HRA analysis. For full methodological details, please refer to the emission calculations and AERMOD dispersion modeling methodology from sections 4.1 and 4.2 of the Health Risk Assessment Report for the Idaho-Maryland Mine Project, Nevada County, California (Dudek 2021).

As noted on page 4.8-47 of the Draft Environmental Impact Report (DEIR), hexavalent chromium is present in cement in small quantities and usually is at a concentration of about 40 parts per million (ppm) (0.0040%) in typical cement. Dust emissions from cement loading of the project storage silo is estimated at 0.0085 pounds per day, which equates to 3.86 grams per day, as shown on page 295 of Appendix E.1. Total air emissions of hexavalent chromium would therefore be approximately 154 micrograms per day. Hexavalent chromium has inhalation cancer risk and chronic reference exposure levels, but no acute non-cancer health effects are associated with exposure.

Regarding ANFO combustion and oxides of nitrogen (of which NO_2 is a constituent), NOx is a criteria air pollutant and has been analyzed as such. As discussed on page 4.3-41 of the DEIR, the Northern Sierra Air Quality Management District (NSAQMD) established thresholds of significance for CEQA purposes to achieve and maintain the National and California Ambient Air Quality Standards (AAQS). Because an AAQS is based on maximum pollutant levels in outdoor air that would not harm the public's health, and air district thresholds pertain to attainment of the AAQS, a project that complies with the thresholds established by a local air district, such as the NSAQMD, would not result in adverse effects to human health related to criteria pollutant emissions. NO_2 only has an acute reference exposure level, so no cancer or chronic non-cancer health effects are associated with exposure.

Hexavalent chromium and NO_2 were evaluated in the HRA consistent with the methodologies presented in the DEIR. In summary, there would be no change to the cancer impacts with and without mitigation as shown in the DEIR. The unmitigated chronic non-cancer health risk would increase from 0.6 to 0.7; however, this would remain less than the NSAQMD significance threshold of 1.0. The mitigated chronic non-cancer health risk would not change from the results in the DEIR. The unmitigated and mitigated acute non-cancer health impacts would increase from

0.004 in the DEIR to 0.1; however, this would remain less than the NSAQMD significance threshold of 1.0. As such, there would be no change to impact determination in the DEIR.