FEHR PEERS

Memorandum

Date: September 16, 2025

To: City of Tumwater

From: Siddharth Sivakumar & Daniel Dye, Fehr & Peers

Subject: City of Tumwater Vehicle Operations Analysis Reports

TC24-0105

The City of Tumwater is in the process of updating the Transportation Plan of its Comprehensive Plan with a planning horizon of 2045. This appendix provides outputs from the software platforms used for existing and future vehicle operations analysis.

Traffic Operations Methodology

To understand traffic operations in the City of Tumwater, the project team utilized Synchro traffic operations analysis software for signalized or stop controlled intersections, and SIDRA software for roundabouts. The existing conditions analysis was based on 2024 conditions, while future analysis was completed for forecast conditions in 2045. The analysis was carried out for the weekday PM peak hour (the highest volume hour between 4 PM and 6 PM). Two future scenarios were considered, a baseline scenario with planned intersection improvements and a mitigation scenario with additional improvements assumed for intersections that failed in the future baseline scenario.

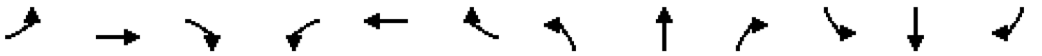
The following pages have PM Peak Hour operations reports for the following scenarios:

1. Existing (2024)
2. Future (2045) Baseline
3. Future (2045) with Mitigation (only for the five intersections that failed in the above scenario)

Existing (2024)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	285	17	0	18	30	32	316	128	47	477	257
Future Volume (vph)	79	285	17	0	18	30	32	316	128	47	477	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	16
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	1827			1690		1752	1845	1568	1752	3505	1777
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	1827			1690		1752	1845	1568	1752	3505	1777
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	101	365	22	0	23	38	41	405	164	60	612	329
RTOR Reduction (vph)	0	2	0	0	35	0	0	0	104	0	0	124
Lane Group Flow (vph)	101	385	0	0	26	0	41	405	60	60	612	205
Confl. Peds. (#/hr)			5	5								
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Split	NA			NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	23.7	23.7			6.9		4.2	24.3	24.3	6.1	26.2	26.2
Effective Green, g (s)	23.7	23.7			6.9		4.2	24.3	24.3	6.1	26.2	26.2
Actuated g/C Ratio	0.29	0.29			0.09		0.05	0.30	0.30	0.08	0.32	0.32
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5			2.5		2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	512	534			143		90	553	470	131	1133	574
v/s Ratio Prot	0.06	c0.21			c0.02		0.02	c0.22		c0.03	0.17	
v/s Ratio Perm									0.04			0.12
v/c Ratio	0.20	0.72			0.18		0.46	0.73	0.13	0.46	0.54	0.36
Uniform Delay, d1	21.5	25.7			34.4		37.3	25.4	20.6	35.9	22.5	21.0
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	4.9			0.5		2.6	4.7	0.1	1.8	0.4	0.3
Delay (s)	21.7	30.6			34.9		39.9	30.1	20.7	37.7	22.9	21.2
Level of Service	C	C			C		D	C	C	D	C	C
Approach Delay (s/veh)		28.8			34.9			28.3			23.2	
Approach LOS		C			C			C			C	

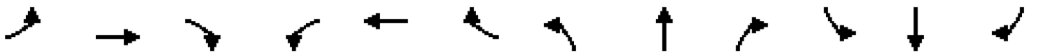
Intersection Summary			
HCM 2000 Control Delay (s/veh)	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	2	54	3	18	98	1	296	32	134	354	3
Future Volume (vph)	46	2	54	3	18	98	1	296	32	134	354	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	14
Total Lost time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00	0.99	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1753	1516		1832	1556	1745	1812		1750	1845	1625
Flt Permitted		0.72	1.00		0.96	1.00	0.52	1.00		0.38	1.00	1.00
Satd. Flow (perm)		1316	1516		1765	1556	961	1812		703	1845	1625
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	53	2	62	3	21	113	1	340	37	154	407	3
RTOR Reduction (vph)	0	0	54	0	0	78	0	2	0	0	0	1
Lane Group Flow (vph)	0	55	8	0	24	35	1	375	0	154	407	2
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases	3	8			4	5		6		5	2	
Permitted Phases	8		8	4		4	6			2		2
Actuated Green, G (s)		7.6	7.6		7.6	17.5	24.7	24.7		39.6	39.6	39.6
Effective Green, g (s)		7.6	7.6		7.6	17.5	24.7	24.7		39.6	39.6	39.6
Actuated g/C Ratio		0.13	0.13		0.13	0.31	0.43	0.43		0.69	0.69	0.69
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		174	201		234	612	414	782		667	1277	1125
v/s Ratio Prot						0.01		c0.21		0.04	c0.22	
v/s Ratio Perm		c0.04	0.01		0.01	0.01	0.00			0.12		0.00
v/c Ratio		0.32	0.04		0.10	0.06	0.00	0.48		0.23	0.32	0.00
Uniform Delay, d1		22.4	21.6		21.8	14.0	9.2	11.6		3.7	3.5	2.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.8	0.1		0.1	0.0	0.0	0.3		0.1	0.1	0.0
Delay (s)		23.2	21.7		21.9	14.0	9.2	12.0		3.9	3.6	2.7
Level of Service		C	C		C	B	A	B		A	A	A
Approach Delay (s/veh)		22.4			15.4			12.0			3.7	
Approach LOS		C			B			B			A	

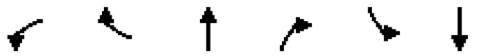
Intersection Summary			
HCM 2000 Control Delay (s/veh)	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	57.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	253	42	0	0	48	21	8	3	0	15	1	573
Future Volume (vph)	253	42	0	0	48	21	8	3	0	15	1	573
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	12	12	11	12	12	16	12	9	9	12
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	6.0
Lane Util. Factor	0.95	0.95			1.00			1.00			1.00	0.88
Frpb, ped/bikes	1.00	1.00			0.99			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.99	1.00
Frt	1.00	1.00			0.96			1.00			1.00	0.85
Flt Protected	0.95	0.97			1.00			0.97			0.95	1.00
Satd. Flow (prot)	1681	1595			1712			2038			1590	2787
Flt Permitted	0.95	0.97			1.00			0.97			1.00	1.00
Satd. Flow (perm)	1681	1595			1712			2038			1666	2787
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	320	53	0	0	61	27	10	4	0	19	1	725
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	0	0
Lane Group Flow (vph)	186	187	0	0	78	0	0	14	0	0	20	725
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)	2		2	2		2	2		2	2		2
Turn Type	Split	NA			NA		Split	NA		Perm	NA	custom
Protected Phases	4	4		1	1		2	2			3	8
Permitted Phases										3		
Actuated Green, G (s)	32.1	32.1			9.4			3.0			1.3	39.4
Effective Green, g (s)	32.1	32.1			9.4			3.0			1.3	39.4
Actuated g/C Ratio	0.46	0.46			0.13			0.04			0.02	0.56
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	6.0
Vehicle Extension (s)	5.0	5.0			5.0			5.0			5.0	5.0
Lane Grp Cap (vph)	773	733			230			87			31	1573
v/s Ratio Prot	0.11	0.12			c0.05			c0.01				c0.26
v/s Ratio Perm											0.01	
v/c Ratio	0.24	0.26			0.34			0.16			0.65	0.46
Uniform Delay, d1	11.4	11.5			27.4			32.2			34.0	8.9
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	0.3	0.4			1.8			1.8			49.1	0.4
Delay (s)	11.8	11.9			29.2			34.0			83.1	9.4
Level of Service	B	B			C			C			F	A
Approach Delay (s/veh)		11.9			29.2			34.0			11.4	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	156	143	10	84	971	231
Future Volume (vph)	156	143	10	84	971	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	11	12
Total Lost time (s)	6.0	6.0	6.2		6.0	6.0
Lane Util. Factor	1.00	1.00	1.00		0.95	0.95
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.88		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	0.97
Satd. Flow (prot)	1787	1599	1566		1641	1733
Flt Permitted	0.95	1.00	1.00		0.95	0.97
Satd. Flow (perm)	1787	1599	1566		1641	1733
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	179	164	11	97	1116	266
RTOR Reduction (vph)	0	132	87	0	0	0
Lane Group Flow (vph)	179	32	21	0	681	701
Confl. Peds. (#/hr)	6			5	5	
Confl. Bikes (#/hr)	2			2	2	
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot	NA		Split	NA
Protected Phases	3	3	2		1	1
Permitted Phases						
Actuated Green, G (s)	15.9	15.9	8.6		31.9	31.9
Effective Green, g (s)	15.9	15.9	8.6		31.9	31.9
Actuated g/C Ratio	0.20	0.20	0.11		0.39	0.39
Clearance Time (s)	6.0	6.0	6.2		6.0	6.0
Vehicle Extension (s)	6.0	6.0	6.0		3.0	3.0
Lane Grp Cap (vph)	350	313	166		646	682
v/s Ratio Prot	c0.10	0.02	c0.01		c0.41	0.40
v/s Ratio Perm						
v/c Ratio	0.51	0.10	0.13		1.05	1.03
Uniform Delay, d1	29.1	26.7	32.8		24.6	24.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.3	0.4	1.0		50.5	41.8
Delay (s)	32.4	27.1	33.8		75.1	66.3
Level of Service	C	C	C		E	E
Approach Delay (s/veh)	29.9		33.8			70.6
Approach LOS	C		C			E

Intersection Summary			
HCM 2000 Control Delay (s/veh)	60.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	81.0	Sum of lost time (s)	21.4
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

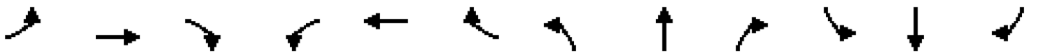
Intersection	
Int Delay, s/veh	12

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	854	134	479	259	0	0	0	112	0	0	0
Future Vol, veh/h	0	854	134	479	259	0	0	0	112	0	0	0
Conflicting Peds, #/hr	0	0	6	6	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	250	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	0	982	154	551	298	0	0	0	129	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	298	0	0	1142	0	0	-	2465	574	1891	2542	298
Stage 1	-	-	-	-	-	-	-	1065	-	1400	1400	-
Stage 2	-	-	-	-	-	-	-	1400	-	491	1142	-
Critical Hdwy	4.115	-	-	4.115	-	-	-	6.515	6.915	7.315	6.515	6.215
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.515	-	6.115	5.515	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	5.515	-	6.515	5.515	-
Follow-up Hdwy	2.2095	-	-	2.2095	-	-	-	4.0095	3.3095	3.5095	4.0095	3.3095
Pot Cap-1 Maneuver	1268	-	-	614	-	-	0	30	465	48	27	743
Stage 1	-	-	-	-	-	-	0	300	-	174	208	-
Stage 2	-	-	-	-	-	-	0	208	-	531	276	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1268	-	-	611	-	-	-	3	463	8	3	743
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	3	-	8	3	-
Stage 1	-	-	-	-	-	-	-	299	-	174	20	-
Stage 2	-	-	-	-	-	-	-	20	-	383	275	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	0	27.5	15.7	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	1268	-	-	611	-	-	-
HCM Lane V/C Ratio	0.278	-	-	-	0.901	-	-	-
HCM Control Delay (s/veh)	15.7	0	-	-	42.3	-	-	0
HCM Lane LOS	C	A	-	-	E	-	-	A
HCM 95th %tile Q (veh)	1.1	0	-	-	11.1	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	752	99	266	543	2	16	165	418	11	208	146
Future Volume (veh/h)	80	752	99	266	543	2	16	165	418	11	208	146
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		0.98	0.99		0.98	1.00		0.96
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	90	845	0	299	610	2	18	185	288	12	234	64
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	170	1146		361	801	3	243	309	576	203	423	112
Arrive On Green	0.09	0.32	0.00	0.20	0.43	0.43	0.03	0.16	0.16	0.02	0.15	0.15
Sat Flow, veh/h	1795	3582	1598	1795	1878	6	1795	1885	1560	1795	2770	736
Grp Volume(v), veh/h	90	845	0	299	0	612	18	185	288	12	149	149
Grp Sat Flow(s),veh/h/ln	1795	1791	1598	1795	0	1884	1795	1885	1560	1795	1791	1716
Q Serve(g_s), s	3.3	14.7	0.0	11.2	0.0	19.3	0.0	6.4	6.2	0.0	5.4	5.6
Cycle Q Clear(g_c), s	3.3	14.7	0.0	11.2	0.0	19.3	0.0	6.4	6.2	0.0	5.4	5.6
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		0.43
Lane Grp Cap(c), veh/h	170	1146		361	0	803	243	309	576	203	273	262
V/C Ratio(X)	0.53	0.74		0.83	0.00	0.76	0.07	0.60	0.50	0.06	0.54	0.57
Avail Cap(c_a), veh/h	385	1689		1078	0	1610	540	1099	1230	519	1044	1000
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	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	21.2	0.0	26.8	0.0	17.0	28.4	27.1	7.1	29.7	27.4	27.5
Incr Delay (d2), s/veh	2.6	0.9	0.0	4.9	0.0	1.5	0.1	1.9	0.7	0.1	1.7	1.9
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	1.5	6.0	0.0	5.1	0.0	8.0	0.3	2.9	2.7	0.2	2.3	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	32.8	22.1	0.0	31.7	0.0	18.6	28.5	29.0	7.7	29.8	29.1	29.5
LnGrp LOS	C	C		C		B	C	C	A	C	C	C
Approach Vol, veh/h		935			911			491			310	
Approach Delay, s/veh		23.1			22.9			16.5			29.3	
Approach LOS		C			C			B			C	

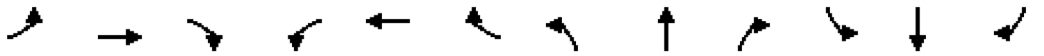
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	16.7	19.1	27.6	7.4	15.9	11.6	35.0
Change Period (Y+Rc), s	5.0	5.2	5.0	* 5.2	5.0	5.2	5.0	5.2
Max Green Setting (Gmax), s	14.0	40.8	42.0	* 33	14.0	40.8	15.0	59.8
Max Q Clear Time (g_c+I1), s	2.0	8.4	13.2	16.7	2.0	7.6	5.3	21.3
Green Ext Time (p_c), s	0.0	2.1	0.9	5.7	0.0	1.8	0.1	5.1

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	22.5
HCM 6th LOS	C

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	345	789	3	157	60	602	87	9	130	225	78
Future Volume (vph)	54	345	789	3	157	60	602	87	9	130	225	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	9	12	12	12	12	12	12	12
Total Lost time (s)	6.2	6.2	6.2	6.2	6.2		6.2	6.2		6.2	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1778	1881	1573	1661	1609		3467	1848		1787	1881	1570
Flt Permitted	0.55	1.00	1.00	0.33	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1037	1881	1573	571	1609		3467	1848		1787	1881	1570
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	58	371	848	3	169	65	647	94	10	140	242	84
RTOR Reduction (vph)	0	0	173	0	15	0	0	4	0	0	0	66
Lane Group Flow (vph)	58	371	675	3	219	0	647	100	0	140	242	18
Confl. Peds. (#/hr)	5		6	6		5	5		5	5		5
Confl. Bikes (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	pm+ov	Perm	NA		Split	NA		Split	NA	Perm
Protected Phases		8	1		4		1	1		2	2	
Permitted Phases	8		8	4								2
Actuated Green, G (s)	20.0	20.0	39.9	20.0	20.0		19.9	19.9		15.9	15.9	15.9
Effective Green, g (s)	20.0	20.0	39.9	20.0	20.0		19.9	19.9		15.9	15.9	15.9
Actuated g/C Ratio	0.27	0.27	0.54	0.27	0.27		0.27	0.27		0.21	0.21	0.21
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2		6.2	6.2		6.2	6.2	6.2
Vehicle Extension (s)	3.0	3.0	2.5	3.0	3.0		2.5	2.5		3.0	3.0	3.0
Lane Grp Cap (vph)	278	505	974	153	432		927	494		381	401	335
v/s Ratio Prot		0.20	c0.19		0.14		0.19	0.05		0.08	c0.13	
v/s Ratio Perm	0.06		0.24	0.01								0.01
v/c Ratio	0.21	0.73	0.69	0.02	0.51		0.70	0.20		0.37	0.60	0.05
Uniform Delay, d1	21.1	24.8	12.7	20.0	23.0		24.5	21.1		25.0	26.4	23.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	5.5	2.0	0.1	0.9		2.1	0.1		0.6	2.6	0.1
Delay (s)	21.4	30.3	14.7	20.0	24.0		26.7	21.3		25.6	29.0	23.3
Level of Service	C	C	B	C	C		C	C		C	C	C
Approach Delay (s/veh)		19.5			23.9			25.9			26.9	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	18.6
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	85.7
Intersection LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	69	593	398	16	108	90
Future Vol, veh/h	69	593	398	16	108	90
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	81	698	468	19	127	106
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay, s/veh	135.9	38.5	16.6
HCM LOS	F	E	C

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	10%	55%
Vol Thru, %	96%	0%	45%
Vol Right, %	4%	90%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	414	662	198
LT Vol	0	69	108
Through Vol	398	0	90
RT Vol	16	593	0
Lane Flow Rate	487	779	233
Geometry Grp	1	1	1
Degree of Util (X)	0.856	1.228	0.448
Departure Headway (Hd)	6.923	5.675	7.614
Convergence, Y/N	Yes	Yes	Yes
Cap	526	646	475
Service Time	4.923	3.675	5.614
HCM Lane V/C Ratio	0.926	1.206	0.491
HCM Control Delay, s/veh	38.5	135.9	16.6
HCM Lane LOS	E	F	C
HCM 95th-tile Q	9.1	28.4	2.3

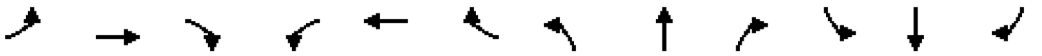
Intersection	
Int Delay, s/veh	8.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	109	150	163	66	155	309
Future Vol, veh/h	109	150	163	66	155	309
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	-	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	121	167	181	73	172	343

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	905	218	0	0	254	0
Stage 1	218	-	-	-	-	-
Stage 2	687	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	308	824	-	-	1317	-
Stage 1	821	-	-	-	-	-
Stage 2	501	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	268	824	-	-	1317	-
Mov Cap-2 Maneuver	268	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	435	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	27.4	0	2.7
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	440	1317	-
HCM Lane V/C Ratio	-	-	0.654	0.131	-
HCM Control Delay (s/veh)	-	-	27.4	8.1	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q (veh)	-	-	4.6	0.5	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	0	102	0	0	0	124	376	0	0	379	20
Future Volume (veh/h)	75	0	102	0	0	0	124	376	0	0	379	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		1.00	1.00		1.00	1.00		1.00	1.00		0.96
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	1885	1885	1885	1885	1885	1961	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	82	0	0	0	0	0	136	413	0	0	416	18
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	359	0		0	224		183	1989	0	5	1023	44
Arrive On Green	0.12	0.00	0.00	0.00	0.00	0.00	0.10	0.56	0.00	0.00	0.29	0.29
Sat Flow, veh/h	1403	0	1598	0	1885	1662	1795	3676	0	1795	3490	151
Grp Volume(v), veh/h	82	0	0	0	0	0	136	413	0	0	213	221
Grp Sat Flow(s),veh/h/ln	1403	0	1598	0	1885	1662	1795	1791	0	1795	1791	1850
Q Serve(g_s), s	2.0	0.0	0.0	0.0	0.0	0.0	2.8	2.2	0.0	0.0	3.6	3.6
Cycle Q Clear(g_c), s	2.0	0.0	0.0	0.0	0.0	0.0	2.8	2.2	0.0	0.0	3.6	3.6
Prop In Lane	1.00		1.00	0.00		1.00	1.00		0.00	1.00		0.08
Lane Grp Cap(c), veh/h	359	0		0	224		183	1989	0	5	525	542
V/C Ratio(X)	0.23	0.00		0.00	0.00		0.74	0.21	0.00	0.00	0.41	0.41
Avail Cap(c_a), veh/h	1126	0		0	1254		960	2862	0	960	1431	1478
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	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	0.0	0.0	0.0	0.0	16.3	4.2	0.0	0.0	10.6	10.6
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.0	0.0	0.0	5.9	0.1	0.0	0.0	0.5	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	0.0	0.0	0.0	1.2	0.4	0.0	0.0	1.1	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	15.8	0.0	0.0	0.0	0.0	0.0	22.2	4.2	0.0	0.0	11.1	11.1
LnGrp LOS	B						C	A			B	B
Approach Vol, veh/h		82			0			549			434	
Approach Delay, s/veh		15.8			0.0			8.7			11.1	
Approach LOS		B						A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	26.9		10.5	9.8	17.1		10.5				
Change Period (Y+Rc), s	6.0	6.1		6.1	6.0	6.1		6.1				
Max Green Setting (Gmax), s	20.0	29.9		24.9	20.0	29.9		24.9				
Max Q Clear Time (g_c+I1), s	0.0	4.2		4.0	4.8	5.6		0.0				
Green Ext Time (p_c), s	0.0	2.7		0.4	0.3	2.5		0.0				

Intersection Summary			
HCM 6th Ctrl Delay, s/veh		10.2	
HCM 6th LOS		B	

Notes

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

Intersection	
Int Delay, s/veh	11.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	138	0	0	286	265	0	0	0	253	0	10
Future Vol, veh/h	17	138	0	0	286	265	0	0	0	253	0	10
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	153	0	0	318	294	0	0	0	281	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	617	0	0	158	0	0	672	813	163	666	666	475
Stage 1	-	-	-	-	-	-	196	196	-	470	470	-
Stage 2	-	-	-	-	-	-	476	617	-	196	196	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	963	-	-	1422	-	-	370	313	882	373	380	590
Stage 1	-	-	-	-	-	-	806	739	-	574	560	-
Stage 2	-	-	-	-	-	-	570	481	-	806	739	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	959	-	-	1415	-	-	354	303	875	364	368	586
Mov Cap-2 Maneuver	-	-	-	-	-	-	354	303	-	364	368	-
Stage 1	-	-	-	-	-	-	784	719	-	559	558	-
Stage 2	-	-	-	-	-	-	557	479	-	785	719	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	1	0	0	43.2
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	959	-	-	1415	-	-	369
HCM Lane V/C Ratio	-	0.02	-	-	-	-	-	0.792
HCM Control Delay (s/veh)	0	8.8	0	-	0	-	-	43.2
HCM Lane LOS	A	A	A	-	A	-	-	E
HCM 95th %tile Q (veh)	-	0.1	-	-	0	-	-	6.7

Intersection	
Intersection Delay, s/veh	32.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	235	149	121	191	0	213	127	128	71	170	111
Future Vol, veh/h	20	235	149	121	191	0	213	127	128	71	170	111
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	22	258	164	133	210	0	234	140	141	78	187	122
Number of Lanes	1	1	1	1	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	3	3
HCM Control Delay, s/veh	28.5	25.3	33.5	41.9
HCM LOS	D	D	D	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	50%	0%	100%	0%	0%	100%	100%	0%	60%
Vol Right, %	0%	50%	0%	0%	100%	0%	0%	0%	0%	40%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	213	255	20	235	149	121	191	0	71	281
LT Vol	213	0	20	0	0	121	0	0	71	0
Through Vol	0	127	0	235	0	0	191	0	0	170
RT Vol	0	128	0	0	149	0	0	0	0	111
Lane Flow Rate	234	280	22	258	164	133	210	0	78	309
Geometry Grp	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.673	0.737	0.065	0.726	0.427	0.404	0.607	0	0.231	0.845
Departure Headway (Hd)	10.347	9.462	10.646	10.124	9.393	10.939	10.413	10.413	10.656	9.849
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	349	381	337	356	383	330	346	0	337	367
Service Time	8.104	7.219	8.405	7.883	7.151	8.7	8.174	8.174	8.414	7.606
HCM Lane V/C Ratio	0.67	0.735	0.065	0.725	0.428	0.403	0.607	0	0.231	0.842
HCM Control Delay, s/veh	32.1	34.6	14.1	35.7	19	21	28.1	13.2	16.6	48.3
HCM Lane LOS	D	D	B	E	C	C	D	N	C	E
HCM 95th-tile Q	4.6	5.7	0.2	5.5	2.1	1.9	3.8	0	0.9	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	0	140	0	0	0	123	355	0	0	428	214
Future Volume (veh/h)	245	0	140	0	0	0	123	355	0	0	428	214
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	1.00		1.00	1.00		1.00	1.00		0.97
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	250	0	41	0	0	0	126	362	0	0	437	153
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	534	0	320	166	390	0	436	1816	0	457	720	249
Arrive On Green	0.21	0.00	0.21	0.00	0.00	0.00	0.09	0.51	0.00	0.00	0.28	0.28
Sat Flow, veh/h	1782	0	1547	1377	1885	0	1795	3676	0	1795	2586	895
Grp Volume(v), veh/h	250	0	41	0	0	0	126	362	0	0	301	289
Grp Sat Flow(s),veh/h/ln	1782	0	1547	1377	1885	0	1795	1791	0	1795	1791	1690
Q Serve(g_s), s	5.6	0.0	0.9	0.0	0.0	0.0	1.9	2.4	0.0	0.0	6.3	6.4
Cycle Q Clear(g_c), s	5.6	0.0	0.9	0.0	0.0	0.0	1.9	2.4	0.0	0.0	6.3	6.4
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		0.53
Lane Grp Cap(c), veh/h	534	0	320	166	390	0	436	1816	0	457	499	471
V/C Ratio(X)	0.47	0.00	0.13	0.00	0.00	0.00	0.29	0.20	0.00	0.00	0.60	0.61
Avail Cap(c_a), veh/h	1187	0	886	670	1079	0	1310	2878	0	1074	1439	1358
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	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	0.0	14.0	0.0	0.0	0.0	8.9	5.9	0.0	0.0	13.6	13.6
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.9	1.0
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	2.1	0.0	0.3	0.0	0.0	0.0	0.6	0.6	0.0	0.0	2.1	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	16.3	0.0	14.1	0.0	0.0	0.0	9.2	5.9	0.0	0.0	14.4	14.6
LnGrp LOS	B		B				A	A			B	B
Approach Vol, veh/h		291			0			488			590	
Approach Delay, s/veh		16.0			0.0			6.8			14.5	
Approach LOS		B						A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	28.2		15.1	9.9	18.3		15.1
Change Period (Y+Rc), s	6.0	6.2		6.2	6.0	6.2		6.2
Max Green Setting (Gmax), s	15.0	34.8		24.8	25.0	34.8		24.8
Max Q Clear Time (g_c+I1), s	10.3	4.4		7.6	3.9	8.4		0.0
Green Ext Time (p_c), s	0.0	2.0		0.7	0.2	3.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	12.1
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	919	116	437	589	85	59	124	516	104	167	14
Future Volume (veh/h)	26	919	116	437	589	85	59	124	516	104	167	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.99		1.00	0.99		0.97
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	1885	1885	1885	1885	1885	1885	1885	1885	1961	1885	1885	1885
Adj Flow Rate, veh/h	28	988	119	470	633	85	63	133	0	112	180	4
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	299	1040	125	523	2103	282	191	208		237	431	355
Arrive On Green	0.32	0.32	0.32	0.29	0.67	0.67	0.11	0.11	0.00	0.07	0.23	0.23
Sat Flow, veh/h	737	3203	386	1795	3161	424	1197	1885	1662	1795	1885	1551
Grp Volume(v), veh/h	28	552	555	470	358	360	63	133	0	112	180	4
Grp Sat Flow(s),veh/h/ln	737	1791	1797	1795	1791	1794	1197	1885	1662	1795	1885	1551
Q Serve(g_s), s	3.2	36.5	36.5	30.4	10.1	10.2	6.0	8.2	0.0	6.5	9.9	0.2
Cycle Q Clear(g_c), s	3.2	36.5	36.5	30.4	10.1	10.2	6.0	8.2	0.0	6.5	9.9	0.2
Prop In Lane	1.00		0.21	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	299	581	583	523	1192	1194	191	208		237	431	355
V/C Ratio(X)	0.09	0.95	0.95	0.90	0.30	0.30	0.33	0.64		0.47	0.42	0.01
Avail Cap(c_a), veh/h	301	586	588	667	1192	1194	352	461		410	461	379
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	39.9	39.9	41.2	8.5	8.5	50.6	51.6	0.0	42.2	39.8	36.1
Incr Delay (d2), s/veh	0.2	25.3	25.4	15.5	0.1	0.1	0.4	1.2	0.0	0.5	0.8	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	0.6	19.7	19.9	15.5	3.7	3.7	1.8	3.9	0.0	2.9	4.6	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.9	65.3	65.4	56.7	8.6	8.6	51.0	52.8	0.0	42.8	40.6	36.1
LnGrp LOS	C	E	E	E	A	A	D	D		D	D	D
Approach Vol, veh/h		1135			1188			196			296	
Approach Delay, s/veh		64.4			27.7			52.2			41.3	
Approach LOS		E			C			D			D	

Timer - Assigned Phs	2	3	4	5	6	8
Phs Duration (G+Y+Rc), s	87.0	14.4	19.7	41.3	45.7	34.1
Change Period (Y+Rc), s	6.4	6.0	6.4	6.0	6.4	6.4
Max Green Setting (Gmax), s	39.6	20.0	29.6	45.0	39.6	29.6
Max Q Clear Time (g_c+I1), s	12.2	8.5	10.2	32.4	38.5	11.9
Green Ext Time (p_c), s	4.7	0.1	0.5	2.8	0.8	1.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	45.6
HCM 6th LOS	D

Notes

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

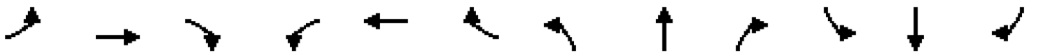
Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	132	236	133	118	54
Future Vol, veh/h	31	132	236	133	118	54
Conflicting Peds, #/hr	0	0	0	0	0	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	120
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	33	140	251	141	126	57

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	392	0	-	0	528	327
Stage 1	-	-	-	-	322	-
Stage 2	-	-	-	-	206	-
Critical Hdwy	4.11	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.209	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1172	-	-	-	513	717
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	831	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1172	-	-	-	497	714
Mov Cap-2 Maneuver	-	-	-	-	497	-
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	831	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.6	0	13.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1172	-	-	-	497	714
HCM Lane V/C Ratio	0.028	-	-	-	0.253	0.08
HCM Control Delay (s/veh)	8.2	0	-	-	14.7	10.5
HCM Lane LOS	A	A	-	-	B	B
HCM 95th %tile Q (veh)	0.1	-	-	-	1	0.3



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	225	0	0	334	18	0	0	0	16	0	5
Future Volume (veh/h)	0	225	0	0	334	18	0	0	0	16	0	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		0.97	1.00		1.00	0.96		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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	0	237	0	0	352	13	0	0	0	17	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	735	2133	0	873	1122	927	214	78	0	286	78	0
Arrive On Green	0.00	0.60	0.00	0.00	0.60	0.60	0.00	0.00	0.00	0.04	0.00	0.00
Sat Flow, veh/h	1795	3676	0	1795	1885	1557	1429	1885	0	1730	1885	0
Grp Volume(v), veh/h	0	237	0	0	352	13	0	0	0	17	0	0
Grp Sat Flow(s),veh/h/ln	1795	1791	0	1795	1885	1557	1429	1885	0	1730	1885	0
Q Serve(g_s), s	0.0	1.0	0.0	0.0	3.1	0.1	0.0	0.0	0.0	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.0	0.0	0.0	3.1	0.1	0.0	0.0	0.0	0.3	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	735	2133	0	873	1122	927	214	78	0	286	78	0
V/C Ratio(X)	0.00	0.11	0.00	0.00	0.31	0.01	0.00	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	1264	3188	0	1402	1678	1386	789	836	0	982	836	0
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	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	2.9	0.0	0.0	3.4	2.8	0.0	0.0	0.0	15.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	3.0	0.0	0.0	3.4	2.8	0.0	0.0	0.0	15.6	0.0	0.0
LnGrp LOS		A			A	A				B		
Approach Vol, veh/h		237			365			0			17	
Approach Delay, s/veh		3.0			3.4			0.0			15.6	
Approach LOS		A			A						B	

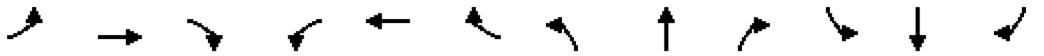
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	26.1		7.5	0.0	26.1		7.5				
Change Period (Y+Rc), s	6.0	6.1		6.1	6.0	6.1		6.1				
Max Green Setting (Gmax), s	10.0	29.9		14.9	10.0	29.9		14.9				
Max Q Clear Time (g_c+I1), s	0.0	5.1		0.0	0.0	3.0		2.3				
Green Ext Time (p_c), s	0.0	1.5		0.0	0.0	1.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		3.6
HCM 6th LOS		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	182	106	277	232	57	168	261	381	118	263	43
Future Volume (vph)	29	182	106	277	232	57	168	261	381	118	263	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	12	11	11	10	12	11	10	12	11	11
Total Lost time (s)	6.0	6.0		6.0	6.0		5.6	6.0	6.0	5.6	6.0	
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3066		1542	3119		1752	1783	1454	1752	3308	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3066		1542	3119		1752	1783	1454	1752	3308	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	29	184	107	280	234	58	170	264	385	119	266	43
RTOR Reduction (vph)	0	71	0	0	8	0	0	0	143	0	11	0
Lane Group Flow (vph)	29	220	0	190	374	0	170	264	242	119	298	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)	2		2	2		2			2	2		
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	1		2	2		7	4	2	3	8	
Permitted Phases									4			
Actuated Green, G (s)	16.6	16.6		53.7	53.7		21.1	27.1	80.8	14.0	20.0	
Effective Green, g (s)	16.6	16.6		53.7	53.7		21.1	27.1	80.8	14.0	20.0	
Actuated g/C Ratio	0.12	0.12		0.40	0.40		0.16	0.20	0.60	0.10	0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.6	6.0	6.0	5.6	6.0	
Vehicle Extension (s)	2.5	2.5		3.0	3.0		3.0	2.5	3.0	3.0	2.5	
Lane Grp Cap (vph)	215	377		613	1240		273	357	934	181	490	
v/s Ratio Prot	0.02	c0.07		c0.12	0.12		c0.10	c0.15	0.10	0.07	0.09	
v/s Ratio Perm									0.06			
v/c Ratio	0.13	0.58		0.31	0.30		0.62	0.74	0.26	0.66	0.61	
Uniform Delay, d1	52.8	55.9		27.9	27.8		53.2	50.6	12.9	58.2	53.8	
Progression Factor	1.00	1.00		0.74	0.74		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	1.9		1.3	0.6		4.4	7.4	0.1	8.3	1.8	
Delay (s)	53.0	57.8		22.0	21.1		57.6	58.0	13.0	66.5	55.6	
Level of Service	D	E		C	C		E	E	B	E	E	
Approach Delay (s/veh)		57.4			21.4			36.8			58.7	
Approach LOS		E			C			D			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	23.6
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	540	6	180	219	181	33	139	258	351	342	363
Future Volume (vph)	179	540	6	180	219	181	33	139	258	351	342	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	16	11	11	11	13	13	16
Total Lost time (s)	4.6	4.6	4.6	4.6	4.6	4.0	4.6	4.6	4.6	4.6	4.6	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1694	3505	1515	1694	3505	1740	1694	1783	1516	1811	1906	1753
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1694	3505	1515	1694	3505	1740	1694	1783	1516	1811	1906	1753
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	183	551	6	184	223	185	34	142	263	358	349	370
RTOR Reduction (vph)	0	0	4	0	0	0	0	0	93	0	0	0
Lane Group Flow (vph)	183	551	2	184	223	185	34	142	170	358	349	370
Confl. Peds. (#/hr)			5	5			5					5
Confl. Bikes (#/hr)	2		2	2		2						
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	1	6		5	2		4	4	4 5	3	3	
Permitted Phases			6			Free						Free
Actuated Green, G (s)	20.9	47.8	47.8	19.3	46.2	135.0	17.1	17.1	41.0	32.4	32.4	135.0
Effective Green, g (s)	20.9	47.8	47.8	19.3	46.2	135.0	17.1	17.1	41.0	32.4	32.4	135.0
Actuated g/C Ratio	0.15	0.35	0.35	0.14	0.34	1.00	0.13	0.13	0.30	0.24	0.24	1.00
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	2.7	2.7	3.2	3.0		3.2	3.2		3.5	3.5	
Lane Grp Cap (vph)	262	1241	536	242	1199	1740	214	225	460	434	457	1753
v/s Ratio Prot	0.11	c0.16		c0.11	0.06		0.02	c0.08	0.11	c0.20	0.18	
v/s Ratio Perm			0.00			0.11						c0.21
v/c Ratio	0.70	0.44	0.00	0.76	0.19	0.11	0.16	0.63	0.37	0.82	0.76	0.21
Uniform Delay, d1	54.1	33.4	28.2	55.6	31.2	0.0	52.5	56.0	36.9	48.6	47.7	0.0
Progression Factor	0.92	1.29	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.5	1.1	0.0	13.3	0.3	0.1	0.4	5.8	0.5	12.4	7.6	0.3
Delay (s)	57.4	44.3	28.2	68.9	31.5	0.1	52.9	61.7	37.4	61.0	55.4	0.3
Level of Service	E	D	C	E	C	A	D	E	D	E	E	A
Approach Delay (s/veh)		47.4			33.3			46.5			38.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	18	59	105	16	214	60	405	90	225	410	93
Future Volume (veh/h)	102	18	59	105	16	214	60	405	90	225	410	93
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		0.97	1.00		0.97	1.00		0.97
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	111	20	13	114	17	47	65	440	68	245	446	81
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	115	12	400	116	10	400	100	822	126	294	1126	203
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.06	0.27	0.27	0.16	0.37	0.37
Sat Flow, veh/h	0	46	1557	0	38	1557	1795	3097	475	1795	3016	544
Grp Volume(v), veh/h	131	0	13	131	0	47	65	253	255	245	263	264
Grp Sat Flow(s),veh/h/ln	46	0	1557	38	0	1557	1795	1791	1781	1795	1791	1769
Q Serve(g_s), s	0.0	0.0	0.4	0.0	0.0	1.3	2.1	7.0	7.1	7.7	6.3	6.4
Cycle Q Clear(g_c), s	14.9	0.0	0.4	14.9	0.0	1.3	2.1	7.0	7.1	7.7	6.3	6.4
Prop In Lane	0.85		1.00	0.87		1.00	1.00		0.27	1.00		0.31
Lane Grp Cap(c), veh/h	126	0	400	126	0	400	100	475	473	294	668	660
V/C Ratio(X)	1.04	0.00	0.03	1.04	0.00	0.12	0.65	0.53	0.54	0.83	0.39	0.40
Avail Cap(c_a), veh/h	126	0	400	126	0	400	774	1078	1072	310	1078	1064
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.6	0.0	16.1	27.9	0.0	16.5	26.8	18.2	18.3	23.5	13.4	13.4
Incr Delay (d2), s/veh	90.1	0.0	0.0	91.7	0.0	0.1	6.8	0.9	1.0	16.8	0.4	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	0.1	4.9	0.0	0.5	1.0	2.8	2.8	4.4	2.3	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	117.7	0.0	16.2	119.6	0.0	16.6	33.6	19.2	19.2	40.2	13.7	13.8
LnGrp LOS	F		B	F		B	C	B	B	D	B	B
Approach Vol, veh/h		144			178			573			772	
Approach Delay, s/veh		108.6			92.4			20.8			22.2	
Approach LOS		F			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.2	27.7		21.0	15.5	21.5		21.0
Change Period (Y+Rc), s	6.0	6.1		6.1	6.0	6.1		6.1
Max Green Setting (Gmax), s	25.0	34.9		14.9	10.0	34.9		14.9
Max Q Clear Time (g_c+I1), s	11.1	8.4		16.9	9.7	9.1		16.9
Green Ext Time (p_c), s	0.1	3.4		0.0	0.0	3.2		0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	36.7
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	0	33	1	3	26	18	457	0	13	597	72
Future Volume (veh/h)	107	0	33	1	3	26	18	457	0	13	597	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.97
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	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	118	0	5	1	3	4	20	502	0	14	656	74
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	53	0	358	33	74	358	38	1875	0	29	1678	189
Arrive On Green	0.26	0.00	0.26	0.26	0.26	0.26	0.01	0.19	0.00	0.01	0.19	0.19
Sat Flow, veh/h	0	0	1397	0	290	1397	1603	3282	0	1603	2888	325
Grp Volume(v), veh/h	118	0	5	4	0	4	20	502	0	14	363	367
Grp Sat Flow(s),veh/h/ln	0	0	1397	290	0	1397	1603	1599	0	1603	1599	1615
Q Serve(g_s), s	0.0	0.0	0.4	0.0	0.0	0.3	1.7	18.0	0.0	1.2	26.8	26.8
Cycle Q Clear(g_c), s	34.6	0.0	0.4	34.6	0.0	0.3	1.7	18.0	0.0	1.2	26.8	26.8
Prop In Lane	1.00		1.00	0.25		1.00	1.00		0.00	1.00		0.20
Lane Grp Cap(c), veh/h	53	0	358	108	0	358	38	1875	0	29	929	938
V/C Ratio(X)	2.21	0.00	0.01	0.04	0.00	0.01	0.53	0.27	0.00	0.48	0.39	0.39
Avail Cap(c_a), veh/h	53	0	358	108	0	358	71	1875	0	119	929	938
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.5	0.0	37.5	40.5	0.0	37.4	66.2	29.8	0.0	66.5	33.7	33.7
Incr Delay (d2), s/veh	601.4	0.0	0.0	0.1	0.0	0.0	4.3	0.4	0.0	4.5	1.2	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	0.0	0.1	0.1	0.0	0.1	0.7	7.8	0.0	0.5	11.8	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	668.9	0.0	37.5	40.5	0.0	37.4	70.5	30.1	0.0	71.0	34.9	34.9
LnGrp LOS	F		D	D		D	E	C		E	C	C
Approach Vol, veh/h		123			8			522			744	
Approach Delay, s/veh		643.3			39.0			31.7			35.6	
Approach LOS		F			D			C			D	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.5	85.5		41.0	9.2	84.8		41.0
Change Period (Y+Rc), s	6.0	6.4		6.4	6.0	6.4		6.4
Max Green Setting (Gmax), s	10.6	71.6		34.6	6.0	75.6		34.6
Max Q Clear Time (g_c+I1), s	13.2	20.0		36.6	3.7	28.8		36.6
Green Ext Time (p_c), s	0.0	3.7		0.0	0.0	5.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	87.7
HCM 6th LOS	F

MOVEMENT SUMMARY

Site: 21 [21: Littlerock Rd & Kingswood Dr (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Littlerock Rd & Kingswood Dr
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Littlerock Rd															
8	T1	All MCs	339	2.0	339	2.0	0.379	2.3	LOS A	2.0	50.1	0.28	0.30	0.28	14.8
18	R2	All MCs	115	2.0	115	2.0	0.379	2.7	LOS A	2.0	50.1	0.28	0.30	0.28	26.2
Approach			454	2.0	454	2.0	0.379	2.4	LOS A	2.0	50.1	0.28	0.30	0.28	17.6
East: Kingswood Dr															
1	L2	All MCs	74	2.0	74	2.0	0.072	6.8	LOS A	0.3	8.5	0.44	0.58	0.44	24.6
16	R2	All MCs	115	2.0	115	2.0	0.091	2.6	LOS A	0.5	11.4	0.42	0.39	0.42	23.5
Approach			189	2.0	189	2.0	0.091	4.2	LOS A	0.5	11.4	0.43	0.47	0.43	24.1
North: Littlerock Rd															
7	L2	All MCs	109	2.0	109	2.0	0.114	7.0	LOS A	0.5	13.0	0.23	0.57	0.23	22.3
4	T1	All MCs	502	2.0	502	2.0	0.353	2.2	LOS A	2.2	54.7	0.25	0.29	0.25	27.7
Approach			611	2.0	611	2.0	0.353	3.0	LOS A	2.2	54.7	0.25	0.34	0.25	26.5
All Vehicles			1254	2.0	1254	2.0	0.379	3.0	LOS A	2.2	54.7	0.29	0.35	0.29	21.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	19	17	22	14	26	5	395	19	71	517	34
Future Volume (veh/h)	15	19	17	22	14	26	5	395	19	71	517	34
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.93		0.91	0.93		0.91	0.99		0.94	0.99		0.95
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	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	16	20	2	23	15	2	5	420	17	76	550	32
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, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	244	266	364	315	179	364	313	841	34	430	1107	64
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.01	0.24	0.24	0.09	0.33	0.33
Sat Flow, veh/h	559	1049	1436	795	705	1436	1767	3445	139	1767	3376	196
Grp Volume(v), veh/h	36	0	2	38	0	2	5	214	223	76	287	295
Grp Sat Flow(s),veh/h/ln	1609	0	1436	1500	0	1436	1767	1763	1821	1767	1763	1809
Q Serve(g_s), s	0.0	0.0	0.1	0.0	0.0	0.1	0.1	5.3	5.4	1.5	6.7	6.7
Cycle Q Clear(g_c), s	0.8	0.0	0.1	0.8	0.0	0.1	0.1	5.3	5.4	1.5	6.7	6.7
Prop In Lane	0.44		1.00	0.61		1.00	1.00		0.08	1.00		0.11
Lane Grp Cap(c), veh/h	510	0	364	494	0	364	313	431	445	430	578	593
V/C Ratio(X)	0.07	0.00	0.01	0.08	0.00	0.01	0.02	0.50	0.50	0.18	0.50	0.50
Avail Cap(c_a), veh/h	679	0	521	653	0	521	994	2539	2623	963	2539	2606
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.5	0.0	14.2	14.5	0.0	14.2	14.4	16.6	16.6	11.9	13.8	13.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.9	0.9	0.2	0.7	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.3	0.0	0.0	0.0	2.0	2.0	0.5	2.3	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.5	0.0	14.2	14.6	0.0	14.2	14.4	17.5	17.5	12.1	14.4	14.4
LnGrp LOS	B		B	B		B	B	B	B	B	B	B
Approach Vol, veh/h		38			40			442			658	
Approach Delay, s/veh		14.5			14.6			17.4			14.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.6	20.0		20.4	6.3	24.2		20.4
Change Period (Y+Rc), s	6.0	7.5		7.5	6.0	7.5		7.5
Max Green Setting (Gmax), s	20.0	73.5		18.5	20.0	73.5		18.5
Max Q Clear Time (g_c+I1), s	3.5	7.4		2.8	2.1	8.7		2.8
Green Ext Time (p_c), s	0.1	2.7		0.1	0.0	3.8		0.1

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		15.4
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	48	1	100	3	629	71	77	587	1
Future Volume (veh/h)	0	0	0	48	1	100	3	629	71	77	587	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	0.98		0.95	1.00		0.97	1.00		0.97
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	1885	1961	1885	1885	1961	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	0	0	0	51	1	15	3	669	69	82	624	1
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	0	222	0	274	19	39	486	979	101	405	1100	2
Arrive On Green	0.00	0.00	0.00	0.11	0.11	0.11	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	0	1961	0	1013	171	341	805	1676	173	725	1882	3
Grp Volume(v), veh/h	0	0	0	67	0	0	3	0	738	82	0	625
Grp Sat Flow(s),veh/h/ln	0	1961	0	1525	0	0	805	0	1849	725	0	1885
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.1	0.0	11.0	3.5	0.0	8.2
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.5	0.0	0.0	8.3	0.0	11.0	14.5	0.0	8.2
Prop In Lane	0.00		0.00	0.76		0.22	1.00		0.09	1.00		0.00
Lane Grp Cap(c), veh/h	0	222	0	332	0	0	486	0	1080	405	0	1101
V/C Ratio(X)	0.00	0.00	0.00	0.20	0.00	0.00	0.01	0.00	0.68	0.20	0.00	0.57
Avail Cap(c_a), veh/h	0	494	0	538	0	0	1131	0	2561	986	0	2611
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	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	0.0	0.0	0.0	16.3	0.0	0.0	7.7	0.0	5.7	10.7	0.0	5.1
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.9	0.3	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	2.1	0.4	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.0	16.6	0.0	0.0	7.7	0.0	6.6	11.0	0.0	5.7
LnGrp LOS				B			A		A	B		A
Approach Vol, veh/h		0			67			741			707	
Approach Delay, s/veh		0.0			16.6			6.6			6.3	
Approach LOS					B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	29.2	10.5	29.2	10.5
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	55.0	10.0	55.0	10.0
Max Q Clear Time (g_c+I1), s	16.5	3.5	13.0	0.0
Green Ext Time (p_c), s	6.7	0.1	7.7	0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	6.9
HCM 6th LOS	A

MOVEMENT SUMMARY

Site: 24 [24: Littlerock Rd & Israel Rd & 70th Ave (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Littlerock Rd & Israel Rd & 70th Ave
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Littlerock Rd															
3	L2	All MCs	196	2.0	196	2.0	0.509	9.1	LOS A	3.5	87.8	0.58	0.56	0.58	28.7
8	T1	All MCs	252	2.0	252	2.0	0.509	3.7	LOS A	3.5	87.8	0.58	0.56	0.58	19.0
18	R2	All MCs	62	2.0	62	2.0	0.509	4.3	LOS A	3.5	87.8	0.58	0.56	0.58	29.0
Approach			510	2.0	510	2.0	0.509	5.8	LOS A	3.5	87.8	0.58	0.56	0.58	24.3
East: Israel Rd															
1	L2	All MCs	119	2.0	119	2.0	0.299	10.7	LOS B	1.8	46.3	0.63	0.64	0.63	28.4
6	T1	All MCs	182	2.0	182	2.0	0.299	5.6	LOS A	1.8	46.3	0.63	0.64	0.63	30.6
16	R2	All MCs	138	2.0	138	2.0	0.178	6.3	LOS A	0.9	23.4	0.60	0.63	0.60	28.8
Approach			439	2.0	439	2.0	0.299	7.2	LOS A	1.8	46.3	0.62	0.64	0.62	29.5
North: Littlerock Rd															
7	L2	All MCs	119	2.0	119	2.0	0.532	10.8	LOS B	4.5	113.9	0.78	0.71	0.86	27.1
4	T1	All MCs	389	2.0	389	2.0	0.532	6.6	LOS A	4.5	113.9	0.78	0.71	0.86	25.2
14	R2	All MCs	152	2.0	152	2.0	0.242	6.9	LOS A	1.3	34.2	0.67	0.66	0.67	27.7
Approach			660	2.0	660	2.0	0.532	7.4	LOS A	4.5	113.9	0.76	0.70	0.82	26.1
West: 70th Ave															
5	L2	All MCs	60	2.0	60	2.0	0.176	10.9	LOS B	0.9	21.9	0.59	0.68	0.59	19.4
2	T1	All MCs	81	2.0	81	2.0	0.176	6.0	LOS A	0.9	21.9	0.59	0.68	0.59	30.5
12	R2	All MCs	145	2.0	145	2.0	0.176	6.7	LOS A	0.9	22.2	0.59	0.66	0.59	28.9
Approach			286	2.0	286	2.0	0.176	7.4	LOS A	0.9	22.2	0.59	0.67	0.59	27.5
All Vehicles			1895	2.0	1895	2.0	0.532	6.9	LOS A	4.5	113.9	0.65	0.64	0.67	26.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	400	101	150	394	38	179	43	67	16	124	69
Future Volume (veh/h)	63	400	101	150	394	38	179	43	67	16	124	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.99		0.96	0.97		0.95
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	1885	1885	1885	1885	1885	1885	1885	1961	1885	1885	1885	1885
Adj Flow Rate, veh/h	71	449	106	169	443	41	201	48	29	18	139	59
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	360	515	122	323	656	61	384	292	176	358	203	86
Arrive On Green	0.05	0.35	0.35	0.09	0.39	0.39	0.12	0.26	0.26	0.02	0.16	0.16
Sat Flow, veh/h	1795	1464	346	1795	1694	157	1795	1124	679	1795	1233	523
Grp Volume(v), veh/h	71	0	555	169	0	484	201	0	77	18	0	198
Grp Sat Flow(s),veh/h/ln	1795	0	1809	1795	0	1851	1795	0	1803	1795	0	1756
Q Serve(g_s), s	1.7	0.0	19.4	3.9	0.0	14.7	5.9	0.0	2.2	0.6	0.0	7.2
Cycle Q Clear(g_c), s	1.7	0.0	19.4	3.9	0.0	14.7	5.9	0.0	2.2	0.6	0.0	7.2
Prop In Lane	1.00		0.19	1.00		0.08	1.00		0.38	1.00		0.30
Lane Grp Cap(c), veh/h	360	0	637	323	0	716	384	0	468	358	0	289
V/C Ratio(X)	0.20	0.00	0.87	0.52	0.00	0.68	0.52	0.00	0.16	0.05	0.00	0.68
Avail Cap(c_a), veh/h	793	0	791	693	0	809	573	0	522	718	0	768
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	0.00	1.00
Uniform Delay (d), s/veh	13.6	0.0	20.5	15.1	0.0	17.2	18.9	0.0	19.4	22.7	0.0	26.6
Incr Delay (d2), s/veh	0.1	0.0	8.8	1.3	0.0	1.9	0.4	0.0	0.1	0.0	0.0	2.9
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	0.6	0.0	9.2	1.6	0.0	6.2	2.3	0.0	0.9	0.2	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	13.7	0.0	29.3	16.4	0.0	19.1	19.3	0.0	19.4	22.7	0.0	29.5
LnGrp LOS	B		C	B		B	B		B	C		C
Approach Vol, veh/h		626			653			278			216	
Approach Delay, s/veh		27.5			18.4			19.3			28.9	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	31.1	5.9	22.5	10.5	28.7	12.4	16.1
Change Period (Y+Rc), s	4.5	4.9	4.5	4.9	4.5	4.9	4.5	4.9
Max Green Setting (Gmax), s	20.0	29.6	15.0	19.6	20.0	29.6	15.0	29.6
Max Q Clear Time (g_c+I1), s	3.7	16.7	2.6	4.2	5.9	21.4	7.9	9.2
Green Ext Time (p_c), s	0.1	2.7	0.0	0.2	0.4	2.4	0.2	1.1

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	23.1
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	123	243	57	155	39	180	358	11	16	642	147
Future Volume (veh/h)	79	123	243	57	155	39	180	358	11	16	642	147
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
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	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	93	145	241	67	182	40	212	421	12	19	755	160
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	328	151	252	179	351	77	308	1419	40	430	957	203
Arrive On Green	0.06	0.27	0.27	0.05	0.26	0.26	0.11	0.45	0.45	0.03	0.37	0.37
Sat Flow, veh/h	1603	560	931	1603	1330	292	1603	3173	90	1603	2610	553
Grp Volume(v), veh/h	93	0	386	67	0	222	212	212	221	19	463	452
Grp Sat Flow(s),veh/h/ln	1603	0	1491	1603	0	1623	1603	1599	1664	1603	1599	1564
Q Serve(g_s), s	3.8	0.0	23.3	2.7	0.0	10.7	7.0	7.7	7.7	0.7	23.5	23.6
Cycle Q Clear(g_c), s	3.8	0.0	23.3	2.7	0.0	10.7	7.0	7.7	7.7	0.7	23.5	23.6
Prop In Lane	1.00		0.62	1.00		0.18	1.00		0.05	1.00		0.35
Lane Grp Cap(c), veh/h	328	0	403	179	0	428	308	715	744	430	587	574
V/C Ratio(X)	0.28	0.00	0.96	0.38	0.00	0.52	0.69	0.30	0.30	0.04	0.79	0.79
Avail Cap(c_a), veh/h	670	0	403	531	0	439	577	957	996	828	957	936
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	0.0	32.8	25.2	0.0	28.7	19.0	16.1	16.1	17.1	25.8	25.8
Incr Delay (d2), s/veh	0.6	0.0	34.1	1.6	0.0	1.2	3.3	0.3	0.3	0.1	2.9	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	1.5	0.0	12.1	1.1	0.0	4.3	2.6	2.7	2.8	0.2	8.9	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.4	0.0	66.9	26.8	0.0	29.9	22.2	16.4	16.4	17.1	28.7	28.7
LnGrp LOS	C		E	C		C	C	B	B	B	C	C
Approach Vol, veh/h		479			289			645			934	
Approach Delay, s/veh		58.4			29.2			18.3			28.5	
Approach LOS		E			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.8	45.7	9.4	29.5	14.2	38.3	10.0	28.9
Change Period (Y+Rc), s	4.5	4.8	4.5	4.8	4.5	4.8	4.5	4.8
Max Green Setting (Gmax), s	25.0	54.7	25.0	24.7	25.0	54.7	25.0	24.7
Max Q Clear Time (g_c+I1), s	12.7	9.7	4.7	25.3	9.0	25.6	5.8	12.7
Green Ext Time (p_c), s	0.0	3.3	0.2	0.0	0.7	8.0	0.3	1.2

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	31.9
HCM 6th LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	556	32	31	160	185	511
Future Volume (veh/h)	556	32	31	160	185	511
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.97	1.00			0.97
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	1885	1885	1885	1885	1885	1961
Adj Flow Rate, veh/h	598	32	33	172	199	345
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1
Cap, veh/h	691	37	44	229	468	399
Arrive On Green	0.41	0.41	0.15	0.15	0.25	0.25
Sat Flow, veh/h	1688	90	301	1569	1885	1607
Grp Volume(v), veh/h	631	0	205	0	199	345
Grp Sat Flow(s),veh/h/ln	1781	0	1870	0	1885	1607
Q Serve(g_s), s	29.7	0.0	9.6	0.0	8.1	18.8
Cycle Q Clear(g_c), s	29.7	0.0	9.6	0.0	8.1	18.8
Prop In Lane	0.95	0.05	0.16			1.00
Lane Grp Cap(c), veh/h	729	0	273	0	468	399
V/C Ratio(X)	0.87	0.00	0.75	0.00	0.43	0.87
Avail Cap(c_a), veh/h	1166	0	612	0	617	526
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	24.7	0.0	37.5	0.0	29.0	33.0
Incr Delay (d2), s/veh	7.2	0.0	8.5	0.0	0.6	11.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.1	0.0	4.9	0.0	3.7	8.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	31.9	0.0	46.0	0.0	29.6	44.3
LnGrp LOS	C		D		C	D
Approach Vol, veh/h	631			205	544	
Approach Delay, s/veh	31.9			46.0	38.9	
Approach LOS	C			D	D	

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	43.5	28.7	19.4
Change Period (Y+Rc), s	6.0	6.0	6.0
Max Green Setting (Gmax), s	60.0	30.0	30.0
Max Q Clear Time (g_c+I1), s	31.7	20.8	11.6
Green Ext Time (p_c), s	5.8	1.7	1.8

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	36.8
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

MOVEMENT SUMMARY

Site: 28 [28: Littlerock Rd & Tumwater Blvd (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Littlerock Rd & Tumwater Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Littlerock Rd															
8	T1	All MCs	214	2.0	214	2.0	0.162	3.4	LOS A	0.8	20.3	0.46	0.42	0.46	28.1
18	R2	All MCs	114	2.0	114	2.0	0.162	3.9	LOS A	0.8	20.3	0.46	0.46	0.46	29.7
Approach			328	2.0	328	2.0	0.162	3.6	LOS A	0.8	20.3	0.46	0.44	0.46	28.6
East: Tumwater Blvd															
1	L2	All MCs	187	2.0	187	2.0	0.187	9.6	LOS A	0.9	21.8	0.38	0.63	0.38	28.0
16	R2	All MCs	290	2.0	290	2.0	0.260	4.3	LOS A	1.3	32.7	0.39	0.49	0.39	29.8
Approach			477	2.0	477	2.0	0.260	6.4	LOS A	1.3	32.7	0.38	0.54	0.38	29.0
North: Littlerock Rd															
7	L2	All MCs	330	2.0	330	2.0	0.277	8.2	LOS A	1.7	43.7	0.43	0.58	0.43	27.9
4	T1	All MCs	339	2.0	339	2.0	0.256	2.8	LOS A	1.6	40.4	0.41	0.34	0.41	28.2
Approach			670	2.0	670	2.0	0.277	5.5	LOS A	1.7	43.7	0.42	0.45	0.42	28.1
All Vehicles			1475	2.0	1475	2.0	0.277	5.4	LOS A	1.7	43.7	0.42	0.48	0.42	28.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	211	228	398	203	0	0	0	0	492	0	243
Future Volume (veh/h)	0	211	228	398	203	0	0	0	0	492	0	243
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	0				1870	1870	1870
Adj Flow Rate, veh/h	0	237	101	447	228	0				384	236	216
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89				0.89	0.89	0.89
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	385	159	520	971	0				607	306	280
Arrive On Green	0.00	0.16	0.16	0.29	0.52	0.00				0.34	0.34	0.34
Sat Flow, veh/h	0	2545	1013	1781	1870	0				1781	899	823
Grp Volume(v), veh/h	0	170	168	447	228	0				384	0	452
Grp Sat Flow(s),veh/h/ln	0	1777	1688	1781	1870	0				1781	0	1722
Q Serve(g_s), s	0.0	5.8	6.1	15.6	4.4	0.0				11.9	0.0	15.4
Cycle Q Clear(g_c), s	0.0	5.8	6.1	15.6	4.4	0.0				11.9	0.0	15.4
Prop In Lane	0.00		0.60	1.00		0.00				1.00		0.48
Lane Grp Cap(c), veh/h	0	279	265	520	971	0				607	0	586
V/C Ratio(X)	0.00	0.61	0.63	0.86	0.23	0.00				0.63	0.00	0.77
Avail Cap(c_a), veh/h	0	1355	1287	815	1426	0				1630	0	1576
HCM Platoon Ratio	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	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	25.7	25.9	22.0	8.6	0.0				18.2	0.0	19.3
Incr Delay (d2), s/veh	0.0	2.2	2.6	6.6	0.1	0.0				1.2	0.0	2.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.5	2.5	6.8	1.5	0.0				4.3	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	28.0	28.5	28.5	8.8	0.0				19.4	0.0	21.8
LnGrp LOS		C	C	C	A					B		C
Approach Vol, veh/h		338			675						836	
Approach Delay, s/veh		28.2			21.8						20.7	
Approach LOS		C			C						C	

Timer - Assigned Phs	2			5	6		8					
Phs Duration (G+Y+Rc), s	38.6			23.7	14.9		26.9					
Change Period (Y+Rc), s	4.6			4.6	4.6		4.6					
Max Green Setting (Gmax), s	50.0			30.0	50.0		60.0					
Max Q Clear Time (g_c+I1), s	6.4			17.6	8.1		17.4					
Green Ext Time (p_c), s	1.4			1.6	2.2		4.9					

Intersection Summary												
HCM 6th Ctrl Delay, s/veh		22.5										
HCM 6th LOS		C										

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	12.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	122	518	0	0	486	825	85	1	177	0	0	0
Future Vol, veh/h	122	518	0	0	486	825	85	1	177	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Yield	Yield	Yield
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	300	-	-	-	-	0	-	-	140	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	147	624	0	0	586	994	102	1	213	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	586	0	-	-	-	0	1504	1504	312
Stage 1	-	-	-	-	-	-	918	918	-
Stage 2	-	-	-	-	-	-	586	586	-
Critical Hdwy	4.13	-	-	-	-	-	6.63	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	5.83	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.43	5.53	-
Follow-up Hdwy	2.219	-	-	-	-	-	3.519	4.019	3.319
Pot Cap-1 Maneuver	987	-	0	0	-	0	122	121	685
Stage 1	-	-	0	0	-	0	350	350	-
Stage 2	-	-	0	0	-	0	555	496	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	987	-	-	-	-	-	104	0	685
Mov Cap-2 Maneuver	-	-	-	-	-	-	104	0	-
Stage 1	-	-	-	-	-	-	298	0	-
Stage 2	-	-	-	-	-	-	555	0	-

Approach	EB	WB	NB
HCM Control Delay, s/v	1.8	0	61.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT
Capacity (veh/h)	104	685	987	-	-
HCM Lane V/C Ratio	0.996	0.311	0.149	-	-
HCM Control Delay (s/veh)	163.4	12.6	9.3	-	-
HCM Lane LOS	F	B	A	-	-
HCM 95th %tile Q (veh)	6.2	1.3	0.5	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	473	98	47	839	67	128	83	52	105	86	331
Future Volume (veh/h)	87	473	98	47	839	67	128	83	52	105	86	331
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	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	106	577	114	57	1023	38	156	101	7	128	105	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	791	156	349	1424	631	200	211	174	207	225	
Arrive On Green	0.07	0.27	0.27	0.20	0.40	0.40	0.11	0.11	0.11	0.12	0.12	0.00
Sat Flow, veh/h	3456	2954	582	1781	3554	1575	1781	1870	1539	1781	1870	1585
Grp Volume(v), veh/h	106	346	345	57	1023	38	156	101	7	128	105	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1759	1781	1777	1575	1781	1870	1539	1781	1870	1585
Q Serve(g_s), s	2.4	14.5	14.6	2.2	19.9	0.7	7.0	4.2	0.3	5.6	4.3	0.0
Cycle Q Clear(g_c), s	2.4	14.5	14.6	2.2	19.9	0.7	7.0	4.2	0.3	5.6	4.3	0.0
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	476	471	349	1424	631	200	211	174	207	225	
V/C Ratio(X)	0.46	0.73	0.73	0.16	0.72	0.06	0.78	0.48	0.04	0.62	0.47	
Avail Cap(c_a), veh/h	2949	752	744	349	2587	1147	652	677	557	869	905	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.9	27.3	27.3	27.4	20.7	4.6	35.4	34.1	32.4	34.5	33.6	0.0
Incr Delay (d2), s/veh	1.7	2.6	2.7	0.3	0.8	0.0	7.6	2.0	0.1	3.6	1.8	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	1.0	6.2	6.2	0.9	7.7	0.4	3.4	2.0	0.1	2.6	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.6	29.9	30.0	27.7	21.5	4.6	43.0	36.1	32.5	38.1	35.4	0.0
LnGrp LOS	D	C	C	C	C	A	D	D	C	D	D	
Approach Vol, veh/h		797			1118			264			233	
Approach Delay, s/veh		31.1			21.3			40.1			36.9	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	39.2	15.8	15.6	22.4	28.3	15.2	16.2
Change Period (Y+Rc), s	6.0	6.3	6.3	* 6.3	6.3	* 6.3	6.0	6.3
Max Green Setting (Gmax), s	70.0	59.7	40.0	* 30	10.0	* 35	30.0	39.7
Max Q Clear Time (g_c+I1), s	4.4	21.9	7.6	6.2	4.2	16.6	9.0	6.3
Green Ext Time (p_c), s	0.5	11.0	0.5	0.6	0.1	4.7	0.5	0.6

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	28.1
HCM 6th LOS	C

Notes

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

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

MOVEMENT SUMMARY

Site: 32 [32: Tumwater Blvd & New Market St (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Tumwater Blvd & New Market St
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: New Market St															
3	L2	All MCs	26	2.0	26	2.0	0.031	6.4	LOS A	0.1	2.9	0.48	0.56	0.48	26.2
8	T1	All MCs	5	2.0	5	2.0	0.031	1.6	LOS A	0.1	2.9	0.48	0.56	0.48	23.4
18	R2	All MCs	21	2.0	21	2.0	0.025	2.6	LOS A	0.1	2.2	0.50	0.44	0.50	27.7
Approach			51	2.0	51	2.0	0.031	4.4	LOS A	0.1	2.9	0.49	0.51	0.49	26.4
East: Tumwater Blvd															
1	L2	All MCs	92	2.0	92	2.0	0.385	9.1	LOS A	2.6	65.8	0.23	0.33	0.23	27.7
6	T1	All MCs	1053	2.0	1053	2.0	0.385	2.3	LOS A	2.6	66.4	0.22	0.28	0.22	32.8
16	R2	All MCs	17	2.0	17	2.0	0.385	2.9	LOS A	2.6	66.4	0.21	0.25	0.21	28.1
Approach			1162	2.0	1162	2.0	0.385	2.9	LOS A	2.6	66.4	0.22	0.29	0.22	32.3
North: New Market St															
7	L2	All MCs	24	2.0	24	2.0	0.039	8.1	LOS A	0.1	3.4	0.57	0.72	0.57	25.8
4	T1	All MCs	1	2.0	1	2.0	0.039	3.4	LOS A	0.1	3.4	0.57	0.72	0.57	23.1
14	R2	All MCs	55	2.0	55	2.0	0.062	2.9	LOS A	0.2	5.8	0.56	0.52	0.56	27.6
Approach			81	2.0	81	2.0	0.062	4.5	LOS A	0.2	5.8	0.56	0.58	0.56	26.9
West: Tumwater Blvd															
5	L2	All MCs	22	2.0	22	2.0	0.297	9.5	LOS A	1.8	46.2	0.33	0.32	0.33	27.7
2	T1	All MCs	727	2.0	727	2.0	0.297	2.7	LOS A	1.8	46.9	0.32	0.31	0.32	32.6
12	R2	All MCs	99	2.0	99	2.0	0.297	3.2	LOS A	1.8	46.9	0.31	0.30	0.31	27.9
Approach			847	2.0	847	2.0	0.297	2.9	LOS A	1.8	46.9	0.32	0.31	0.32	31.9
All Vehicles			2141	2.0	2141	2.0	0.385	3.0	LOS A	2.6	66.4	0.28	0.31	0.28	31.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	213	334	19	298	36	282	421	24	76	600	267
Future Volume (veh/h)	42	213	334	19	298	36	282	421	24	76	600	267
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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	47	237	187	21	331	34	313	468	25	84	667	114
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	91	370	511	51	570	58	446	1239	66	121	1068	467
Arrive On Green	0.05	0.20	0.20	0.03	0.18	0.18	0.13	0.36	0.36	0.07	0.30	0.30
Sat Flow, veh/h	1781	1870	1551	1781	3248	331	3456	3428	183	1781	3554	1554
Grp Volume(v), veh/h	47	237	187	21	180	185	313	242	251	84	667	114
Grp Sat Flow(s),veh/h/ln	1781	1870	1551	1781	1777	1802	1728	1777	1834	1781	1777	1554
Q Serve(g_s), s	1.8	8.3	6.6	0.8	6.6	6.7	6.2	7.2	7.2	3.3	11.6	4.0
Cycle Q Clear(g_c), s	1.8	8.3	6.6	0.8	6.6	6.7	6.2	7.2	7.2	3.3	11.6	4.0
Prop In Lane	1.00		1.00	1.00		0.18	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	91	370	511	51	312	316	446	642	663	121	1068	467
V/C Ratio(X)	0.52	0.64	0.37	0.41	0.58	0.59	0.70	0.38	0.38	0.69	0.62	0.24
Avail Cap(c_a), veh/h	747	777	849	623	738	748	1450	862	890	498	3464	1515
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.1	26.3	18.4	34.1	27.0	27.1	29.8	16.9	16.9	32.6	21.5	18.9
Incr Delay (d2), s/veh	1.7	1.9	0.4	2.0	1.7	1.7	2.0	0.4	0.4	6.9	0.7	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	3.7	2.2	0.4	2.8	2.9	2.6	2.8	2.9	1.6	4.5	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.8	28.2	18.9	36.1	28.7	28.8	31.9	17.3	17.3	39.5	22.3	19.2
LnGrp LOS	C	C	B	D	C	C	C	B	B	D	C	B
Approach Vol, veh/h		471			386			806			865	
Approach Delay, s/veh		25.1			29.2			23.0			23.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	32.1	8.0	20.4	15.2	27.8	9.6	18.9
Change Period (Y+Rc), s	6.0	6.3	6.0	6.3	6.0	6.3	6.0	6.3
Max Green Setting (Gmax), s	20.0	34.7	25.0	29.7	30.0	69.7	30.0	29.7
Max Q Clear Time (g_c+I1), s	5.3	9.2	2.8	10.3	8.2	13.6	3.8	8.7
Green Ext Time (p_c), s	0.1	3.5	0.0	1.9	1.0	7.0	0.0	2.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	24.5
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	1	12	1	2	23	33	214	2	27	404	161
Future Volume (veh/h)	65	1	12	1	2	23	33	214	2	27	404	161
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.99	0.98		0.99	1.00		0.97	1.00		0.97
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	71	1	2	1	2	3	36	233	2	29	439	164
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	338	68	135	340	82	123	326	784	7	609	538	201
Arrive On Green	0.12	0.12	0.12	0.12	0.12	0.12	0.03	0.42	0.42	0.03	0.41	0.41
Sat Flow, veh/h	1394	555	1110	1396	674	1011	1795	1866	16	1795	1297	485
Grp Volume(v), veh/h	71	0	3	1	0	5	36	0	235	29	0	603
Grp Sat Flow(s),veh/h/ln	1394	0	1665	1396	0	1685	1795	0	1882	1795	0	1782
Q Serve(g_s), s	2.0	0.0	0.1	0.0	0.0	0.1	0.5	0.0	3.5	0.4	0.0	12.5
Cycle Q Clear(g_c), s	2.1	0.0	0.1	0.1	0.0	0.1	0.5	0.0	3.5	0.4	0.0	12.5
Prop In Lane	1.00		0.67	1.00		0.60	1.00		0.01	1.00		0.27
Lane Grp Cap(c), veh/h	338	0	203	340	0	205	326	0	790	609	0	739
V/C Ratio(X)	0.21	0.00	0.01	0.00	0.00	0.02	0.11	0.00	0.30	0.05	0.00	0.82
Avail Cap(c_a), veh/h	1236	0	1276	1240	0	1291	697	0	1442	1420	0	1365
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	0.00	1.00
Uniform Delay (d), s/veh	17.1	0.0	16.1	16.2	0.0	16.2	8.5	0.0	8.0	6.7	0.0	10.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	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	0.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.0	0.1	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.2	0.0	16.2	16.2	0.0	16.2	8.5	0.0	8.1	6.8	0.0	11.7
LnGrp LOS	B		B	B		B	A		A	A		B
Approach Vol, veh/h		74			6			271			632	
Approach Delay, s/veh		17.2			16.2			8.2			11.4	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.4	23.3		11.1	7.1	23.5		11.1
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	10.0	32.0		32.0	20.0	32.0		32.0
Max Q Clear Time (g_c+I1), s	2.5	14.5		2.1	2.4	5.5		4.1
Green Ext Time (p_c), s	0.0	2.5		0.0	0.0	0.8		0.1

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		11.0
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	114	0	60	0	609	79	80	896	0
Future Volume (veh/h)	0	0	0	114	0	60	0	609	79	80	896	0
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	0.98		0.95	1.00		0.97	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	1870	1870	1870	1870	1870	1870	1870	1945
Adj Flow Rate, veh/h	0	0	0	121	0	10	0	648	81	85	953	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	216	0	340	0	167	147	719	90	325	1189	1048
Arrive On Green	0.00	0.00	0.00	0.11	0.00	0.11	0.00	0.44	0.44	0.07	0.64	0.00
Sat Flow, veh/h	0	1945	0	1741	0	1508	589	1624	203	1781	1870	1648
Grp Volume(v), veh/h	0	0	0	121	0	10	0	0	729	85	953	0
Grp Sat Flow(s),veh/h/ln	0	1945	0	1741	0	1508	589	0	1827	1781	1870	1648
Q Serve(g_s), s	0.0	0.0	0.0	3.2	0.0	0.3	0.0	0.0	18.1	1.1	18.5	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	3.2	0.0	0.3	0.0	0.0	18.1	1.1	18.5	0.0
Prop In Lane	0.00		0.00	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	0	216	0	340	0	167	147	0	809	325	1189	1048
V/C Ratio(X)	0.00	0.00	0.00	0.36	0.00	0.06	0.00	0.00	0.90	0.26	0.80	0.00
Avail Cap(c_a), veh/h	0	589	0	852	0	610	486	0	1860	1111	2478	2184
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	0.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	20.8	0.0	19.5	0.0	0.0	12.6	9.8	6.6	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	1.6	0.2	0.5	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	0.0	1.2	0.0	0.1	0.0	0.0	5.5	0.3	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.0	21.0	0.0	19.5	0.0	0.0	14.2	9.9	7.1	0.0
LnGrp LOS				C		B			B	A	A	
Approach Vol, veh/h		0			131			729			1038	
Approach Delay, s/veh		0.0			20.9			14.2			7.3	
Approach LOS					C			B			A	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.4	27.9		11.6		37.3		11.6				
Change Period (Y+Rc), s	6.0	6.2		6.2		6.2		6.2				
Max Green Setting (Gmax), s	25.0	49.8		14.8		64.8		19.8				
Max Q Clear Time (g_c+I1), s	13.1	20.1		0.0		20.5		5.2				
Green Ext Time (p_c), s	0.0	1.6		0.0		2.3		0.0				

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		10.9
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	0	37	0	0	0	6	0	395	0	729	143
Future Volume (veh/h)	205	0	37	0	0	0	6	0	395	0	729	143
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	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	1885	1961	1885	1885	1961	1885	1885	1885	1885	1885	1885	1961
Adj Flow Rate, veh/h	238	0	10	0	0	0	7	0	259	0	848	111
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	463	0	296	0	363	0	236	0	865	136	1025	899
Arrive On Green	0.19	0.00	0.19	0.00	0.00	0.00	0.54	0.00	0.54	0.00	0.54	0.54
Sat Flow, veh/h	1771	0	1600	0	1961	0	590	0	1590	1129	1885	1654
Grp Volume(v), veh/h	238	0	10	0	0	0	7	0	259	0	848	111
Grp Sat Flow(s),veh/h/ln	1771	0	1600	0	1961	0	590	0	1590	1129	1885	1654
Q Serve(g_s), s	6.7	0.0	0.3	0.0	0.0	0.0	0.5	0.0	4.7	0.0	19.8	1.7
Cycle Q Clear(g_c), s	6.7	0.0	0.3	0.0	0.0	0.0	20.3	0.0	4.7	0.0	19.8	1.7
Prop In Lane	1.00		1.00	0.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	463	0	296	0	363	0	236	0	865	136	1025	899
V/C Ratio(X)	0.51	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.30	0.00	0.83	0.12
Avail Cap(c_a), veh/h	963	0	747	0	554	0	302	0	1042	1007	2479	2175
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	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	0.0	17.7	0.0	0.0	0.0	18.5	0.0	6.6	0.0	10.0	5.9
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	1.8	0.1
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	2.4	0.0	0.1	0.0	0.0	0.0	0.1	0.0	1.0	0.0	5.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.2	0.0	17.8	0.0	0.0	0.0	18.5	0.0	6.8	0.0	11.8	6.0
LnGrp LOS	C		B				B		A		B	A
Approach Vol, veh/h		248			0			266			959	
Approach Delay, s/veh		21.1			0.0			7.1			11.1	
Approach LOS		C						A			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	36.1	17.0	36.1	17.0
Change Period (Y+Rc), s	7.2	7.2	7.2	7.2
Max Green Setting (Gmax), s	34.8	24.8	69.8	15.0
Max Q Clear Time (g_c+I1), s	22.3	8.7	21.8	0.0
Green Ext Time (p_c), s	1.2	0.6	7.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	12.1
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	194	51	163	124	0	0	0	0	379	0	460
Future Volume (veh/h)	0	194	51	163	124	0	0	0	0	379	0	460
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		0.98
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1826	1826	1826	1826	0				1826	1899	1826
Adj Flow Rate, veh/h	0	220	15	185	141	0				431	0	186
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	544	461	560	912	0				574	0	481
Arrive On Green	0.00	0.30	0.30	0.11	0.50	0.00				0.32	0.00	0.32
Sat Flow, veh/h	0	1826	1547	1739	1826	0				1809	0	1513
Grp Volume(v), veh/h	0	220	15	185	141	0				431	0	186
Grp Sat Flow(s),veh/h/ln	0	1826	1547	1739	1826	0				1809	0	1513
Q Serve(g_s), s	0.0	4.8	0.3	3.3	2.1	0.0				10.7	0.0	4.8
Cycle Q Clear(g_c), s	0.0	4.8	0.3	3.3	2.1	0.0				10.7	0.0	4.8
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	544	461	560	912	0				574	0	481
V/C Ratio(X)	0.00	0.40	0.03	0.33	0.15	0.00				0.75	0.00	0.39
Avail Cap(c_a), veh/h	0	1451	1230	1060	1451	0				1437	0	1202
HCM Platoon Ratio	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	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	14.1	12.5	9.1	6.8	0.0				15.4	0.0	13.4
Incr Delay (d2), s/veh	0.0	0.5	0.0	0.3	0.1	0.0				2.0	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	1.7	0.1	1.0	0.6	0.0				3.7	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	14.6	12.6	9.5	6.9	0.0				17.4	0.0	13.9
LnGrp LOS		B	B	A	A					B		B
Approach Vol, veh/h		235			326						617	
Approach Delay, s/veh		14.5			8.4						16.3	
Approach LOS		B			A						B	

Timer - Assigned Phs	1	2		4		6			
Phs Duration (G+Y+Rc), s	10.1	19.6		20.6		29.7			
Change Period (Y+Rc), s	4.6	4.6		4.6		4.6			
Max Green Setting (Gmax), s	20.0	40.0		40.0		40.0			
Max Q Clear Time (g_c+I1), s	15.3	6.8		12.7		4.1			
Green Ext Time (p_c), s	0.4	1.3		3.2		0.7			

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		13.8
HCM 6th LOS		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	448	0	0	244	354	19	0	92	0	0	0
Future Volume (veh/h)	137	448	0	0	244	354	19	0	92	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1826	1826	0	0	1826	1826	1826	1899	1826			
Adj Flow Rate, veh/h	154	503	0	0	274	0	21	0	11			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	5	5	0	0	5	5	5	5	5			
Cap, veh/h	738	1170	0	0	619		85	0	71			
Arrive On Green	0.15	0.64	0.00	0.00	0.34	0.00	0.05	0.00	0.05			
Sat Flow, veh/h	1739	1826	0	0	1826	1547	1809	0	1511			
Grp Volume(v), veh/h	154	503	0	0	274	0	21	0	11			
Grp Sat Flow(s),veh/h/ln	1739	1826	0	0	1826	1547	1809	0	1511			
Q Serve(g_s), s	1.3	4.0	0.0	0.0	3.4	0.0	0.3	0.0	0.2			
Cycle Q Clear(g_c), s	1.3	4.0	0.0	0.0	3.4	0.0	0.3	0.0	0.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	738	1170	0	0	619		85	0	71			
V/C Ratio(X)	0.21	0.43	0.00	0.00	0.44		0.25	0.00	0.16			
Avail Cap(c_a), veh/h	1664	2477	0	0	2477		2454	0	2050			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	3.8	2.6	0.0	0.0	7.6	0.0	13.5	0.0	13.5			
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.0	0.2	0.0	0.6	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			
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	4.0	2.7	0.0	0.0	7.8	0.0	14.1	0.0	13.9			
LnGrp LOS	A	A			A		B		B			
Approach Vol, veh/h		657			274			32				
Approach Delay, s/veh		3.0			7.8			14.0				
Approach LOS		A			A			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		23.5			8.9	14.6		6.0				
Change Period (Y+Rc), s		4.6			4.6	4.6		4.6				
Max Green Setting (Gmax), s		40.0			20.0	40.0		40.0				
Max Q Clear Time (g_c+I1), s		6.0			3.3	5.4		2.3				
Green Ext Time (p_c), s		0.9			0.3	0.5		0.0				

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	4.7
HCM 6th LOS	A

Notes

User approved changes to right turn type.

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

Intersection	
Int Delay, s/veh	15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	308	157	104	310	166	76
Future Vol, veh/h	308	157	104	310	166	76
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	335	171	113	337	180	83

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	506	0	984	421
Stage 1	-	-	-	-	421	-
Stage 2	-	-	-	-	563	-
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	-	-	1059	-	275	632
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	570	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1059	-	239	632
Mov Cap-2 Maneuver	-	-	-	-	239	-
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	495	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	2.2	65.5
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	297	-	-	1059	-
HCM Lane V/C Ratio	0.886	-	-	0.107	-
HCM Control Delay (s/veh)	65.5	-	-	8.8	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q (veh)	8	-	-	0.4	-

Intersection	
Int Delay, s/veh	6.6

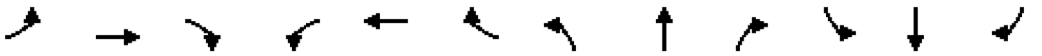
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	604	47	99	277	58	200
Future Vol, veh/h	604	47	99	277	58	200
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	435	400	-	220	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	728	57	119	334	70	241

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	785	0	1300	728
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	572	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	838	-	179	425
Stage 1	-	-	-	-	480	-
Stage 2	-	-	-	-	567	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	838	-	154	425
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	480	-
Stage 2	-	-	-	-	486	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	2.6	29.1
HCM LOS			D

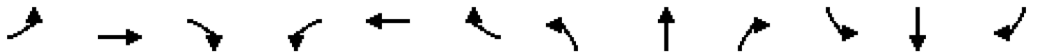
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	154	425	-	-	838	-
HCM Lane V/C Ratio	0.454	0.567	-	-	0.142	-
HCM Control Delay (s/veh)	46.5	24	-	-	10	-
HCM Lane LOS	E	C	-	-	B	-
HCM 95th %tile Q (veh)	2.1	3.4	-	-	0.5	-

Future (2045) Baseline



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	285	19	0	20	40	32	418	130	50	530	280
Future Volume (vph)	96	285	19	0	20	40	32	418	130	50	530	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	16
Total Lost time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1752	1826			1680		1752	1845	1568	1752	3505	1777
Flt Permitted	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1752	1826			1680		1752	1845	1568	1752	3505	1777
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	123	365	24	0	26	51	41	536	167	64	679	359
RTOR Reduction (vph)	0	2	0	0	48	0	0	0	90	0	0	139
Lane Group Flow (vph)	123	387	0	0	29	0	41	536	77	64	679	220
Confl. Peds. (#/hr)			5	5								
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Split	NA			NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	3		4	4		1	6		5	2	
Permitted Phases									6			2
Actuated Green, G (s)	24.0	24.0			6.0		3.1	32.6	32.6	5.1	34.6	34.6
Effective Green, g (s)	24.0	24.0			6.0		3.1	32.6	32.6	5.1	34.6	34.6
Actuated g/C Ratio	0.27	0.27			0.07		0.04	0.37	0.37	0.06	0.39	0.39
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.5	3.5			2.5		2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	479	499			114		61	685	582	101	1382	701
v/s Ratio Prot	0.07	c0.21			c0.02		0.02	c0.29		c0.04	0.19	
v/s Ratio Perm									0.05			0.12
v/c Ratio	0.26	0.78			0.26		0.67	0.78	0.13	0.63	0.49	0.31
Uniform Delay, d1	24.9	29.4			38.7		41.8	24.4	18.2	40.4	19.9	18.3
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	7.6			0.9		23.3	5.6	0.1	10.8	0.2	0.2
Delay (s)	25.2	37.0			39.6		65.1	30.0	18.3	51.2	20.1	18.5
Level of Service	C	D			D		E	C	B	D	C	B
Approach Delay (s/veh)		34.2			39.6			29.3			21.4	
Approach LOS		C			D			C			C	

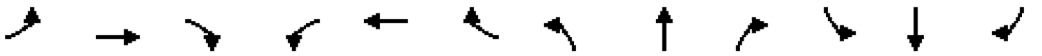
Intersection Summary			
HCM 2000 Control Delay (s/veh)	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	87.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	2	69	3	20	127	1	347	32	158	379	3
Future Volume (vph)	69	2	69	3	20	127	1	347	32	158	379	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	14
Total Lost time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.97		1.00	0.99	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1752	1518		1833	1557	1746	1817		1751	1845	1626
Flt Permitted		0.71	1.00		0.96	1.00	0.51	1.00		0.28	1.00	1.00
Satd. Flow (perm)		1309	1518		1770	1557	936	1817		509	1845	1626
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	79	2	79	3	23	146	1	399	37	182	436	3
RTOR Reduction (vph)	0	0	67	0	0	93	0	3	0	0	0	1
Lane Group Flow (vph)	0	81	12	0	26	53	1	433	0	182	436	2
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases	3	8			4	5		6		5	2	
Permitted Phases	8		8	4		4	6			2		2
Actuated Green, G (s)		8.2	8.2		8.2	19.7	19.2	19.2		35.7	35.7	35.7
Effective Green, g (s)		8.2	8.2		8.2	19.7	19.2	19.2		35.7	35.7	35.7
Actuated g/C Ratio		0.15	0.15		0.15	0.37	0.36	0.36		0.66	0.66	0.66
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)		2.5	2.5		2.5	2.5	2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)		199	230		269	713	333	647		602	1222	1076
v/s Ratio Prot						0.02		c0.24		0.06	c0.24	
v/s Ratio Perm		c0.06	0.01		0.01	0.02	0.00			0.14		0.00
v/c Ratio		0.41	0.05		0.10	0.07	0.00	0.67		0.30	0.36	0.00
Uniform Delay, d1		20.7	19.5		19.7	11.2	11.2	14.7		4.8	4.0	3.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.0	0.1		0.1	0.0	0.0	2.4		0.2	0.1	0.0
Delay (s)		21.6	19.6		19.8	11.2	11.2	17.0		5.1	4.2	3.1
Level of Service		C	B		B	B	B	B		A	A	A
Approach Delay (s/veh)		20.6			12.5			17.0			4.4	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	53.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	60	0	0	59	21	17	3	0	20	10	670
Future Volume (vph)	300	60	0	0	59	21	17	3	0	20	10	670
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	12	12	11	12	12	16	12	9	9	12
Total Lost time (s)	6.0	6.0			6.0			6.0			6.0	6.0
Lane Util. Factor	0.95	0.95			1.00			1.00			1.00	0.88
Frpb, ped/bikes	1.00	1.00			0.99			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	1.00
Frt	1.00	1.00			0.96			1.00			1.00	0.85
Flt Protected	0.95	0.97			1.00			0.96			0.97	1.00
Satd. Flow (prot)	1681	1598			1721			2025			1616	2787
Flt Permitted	0.95	0.97			1.00			0.96			1.00	1.00
Satd. Flow (perm)	1681	1598			1721			2025			1670	2787
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	380	76	0	0	75	27	22	4	0	25	13	848
RTOR Reduction (vph)	0	0	0	0	15	0	0	0	0	0	0	0
Lane Group Flow (vph)	228	228	0	0	87	0	0	26	0	0	38	848
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)	2		2	2		2	2		2	2		2
Turn Type	Split	NA			NA		Split	NA		Perm	NA	custom
Protected Phases	4	4		1	1		2	2			3	8
Permitted Phases										3		
Actuated Green, G (s)	31.2	31.2			5.8			4.9			1.8	39.0
Effective Green, g (s)	31.2	31.2			5.8			4.9			1.8	39.0
Actuated g/C Ratio	0.46	0.46			0.09			0.07			0.03	0.58
Clearance Time (s)	6.0	6.0			6.0			6.0			6.0	6.0
Vehicle Extension (s)	5.0	5.0			5.0			5.0			5.0	5.0
Lane Grp Cap (vph)	774	736			147			146			44	1605
v/s Ratio Prot	0.14	0.14			c0.05			c0.01				c0.30
v/s Ratio Perm											0.02	
v/c Ratio	0.29	0.31			0.59			0.18			0.86	0.53
Uniform Delay, d1	11.4	11.5			29.8			29.5			32.8	8.7
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	0.4	0.5			9.4			1.2			89.7	0.6
Delay (s)	11.8	12.0			39.2			30.7			122.5	9.3
Level of Service	B	B			D			C			F	A
Approach Delay (s/veh)		11.9			39.2			30.7			14.2	
Approach LOS		B			D			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	67.7	Sum of lost time (s)	24.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	160	190	10	100	1010	240
Future Volume (vph)	160	190	10	100	1010	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	11	12	11	12
Total Lost time (s)	6.0	6.0	6.2		6.0	6.0
Lane Util. Factor	1.00	1.00	1.00		0.95	0.95
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.88		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	0.97
Satd. Flow (prot)	1787	1599	1560		1641	1733
Flt Permitted	0.95	1.00	1.00		0.95	0.97
Satd. Flow (perm)	1787	1599	1560		1641	1733
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	184	218	11	115	1161	276
RTOR Reduction (vph)	0	190	103	0	0	0
Lane Group Flow (vph)	184	28	23	0	708	729
Confl. Peds. (#/hr)	6			5	5	
Confl. Bikes (#/hr)	2			2	2	
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Prot	NA		Split	NA
Protected Phases	3	3	2		1	1
Permitted Phases						
Actuated Green, G (s)	13.2	13.2	11.1		53.0	53.0
Effective Green, g (s)	13.2	13.2	11.1		53.0	53.0
Actuated g/C Ratio	0.13	0.13	0.11		0.52	0.52
Clearance Time (s)	6.0	6.0	6.2		6.0	6.0
Vehicle Extension (s)	6.0	6.0	6.0		3.0	3.0
Lane Grp Cap (vph)	230	206	169		849	896
v/s Ratio Prot	c0.10	0.02	c0.02		c0.43	0.42
v/s Ratio Perm						
v/c Ratio	0.80	0.14	0.14		0.83	0.81
Uniform Delay, d1	43.3	39.5	41.3		21.0	20.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	20.8	0.9	1.1		7.1	5.7
Delay (s)	64.2	40.4	42.4		28.0	26.3
Level of Service	E	D	D		C	C
Approach Delay (s/veh)	51.3		42.4			27.2
Approach LOS	D		D			C

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	102.4	Sum of lost time (s)	21.4
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

MOVEMENT SUMMARY

Site: 24 [5: Custer Way SW & Boston St SW (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Custer Way SW & Boston St SW
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Boston St SW															
18	R2	All MCs	172	1.0	172	1.0	0.301	5.3	LOS A	1.3	32.1	0.68	0.74	0.68	23.5
Approach			172	1.0	172	1.0	0.301	5.3	LOS A	1.3	32.1	0.68	0.74	0.68	23.5
East: Custer Way															
1	L2	All MCs	551	1.0	551	1.0	0.703	5.5	LOS A	0.0	0.0	0.00	0.43	0.00	23.8
6	T1	All MCs	334	1.0	334	1.0	0.703	0.9	LOS A	0.0	0.0	0.00	0.43	0.00	24.0
16	R2	All MCs	1	1.0	1	1.0	0.703	2.4	LOS A	0.0	0.0	0.00	0.43	0.00	22.1
Approach			886	1.0	886	1.0	0.703	3.7	LOS A	0.0	0.0	0.00	0.43	0.00	23.9
North: Boston St SW															
7	L2	All MCs	1	1.0	1	1.0	0.005	5.8	LOS A	0.0	0.7	0.66	0.44	0.66	20.5
4	T1	All MCs	1	1.0	1	1.0	0.005	5.3	LOS A	0.0	0.7	0.66	0.44	0.66	20.5
14	R2	All MCs	1	1.0	1	1.0	0.005	5.3	LOS A	0.0	0.7	0.66	0.44	0.66	20.5
Approach			3	1.0	3	1.0	0.005	5.5	LOS A	0.0	0.7	0.66	0.44	0.66	20.5
West: Custer Way															
2	T1	All MCs	1000	1.0	1000	1.0	0.604	6.8	LOS A	5.6	141.6	0.77	0.75	0.96	23.2
12	R2	All MCs	195	1.0	195	1.0	0.604	6.8	LOS A	5.6	141.6	0.77	0.73	0.93	23.3
Approach			1195	1.0	1195	1.0	0.604	6.8	LOS A	5.6	141.6	0.77	0.74	0.95	23.2
All Vehicles			2257	1.0	2257	1.0	0.703	5.5	LOS A	5.6	141.6	0.46	0.62	0.56	23.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 24 [6: Custer Way SW & Capitol Blvd (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Custer Way SW & Capitol Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Capitol Blvd															
3	L2	All MCs	22	1.0	22	1.0	0.459	13.9	LOS B	2.4	60.5	0.76	0.85	0.89	26.3
8	T1	All MCs	225	1.0	225	1.0	0.459	8.1	LOS A	2.4	60.5	0.76	0.85	0.89	28.1
18	R2	All MCs	539	1.0	539	1.0	0.740	10.3	LOS B	6.0	152.4	0.88	1.01	1.24	25.7
Approach			787	1.0	787	1.0	0.740	9.8	LOS A	6.0	152.4	0.84	0.96	1.13	26.1
East: Custer Way															
1	L2	All MCs	381	1.0	381	1.0	0.388	7.5	LOS A	2.5	63.8	0.61	0.62	0.61	25.6
6	T1	All MCs	639	1.0	639	1.0	0.529	2.1	LOS A	4.2	105.3	0.67	0.32	0.67	23.8
16	R2	All MCs	2	1.0	2	1.0	0.529	2.6	LOS A	4.2	105.3	0.67	0.32	0.67	23.3
Approach			1022	1.0	1022	1.0	0.529	4.1	LOS A	4.2	105.3	0.65	0.43	0.65	24.5
North: Capitol Blvd															
7	L2	All MCs	12	1.0	12	1.0	0.360	11.2	LOS B	1.8	44.6	0.72	0.78	0.77	22.8
4	T1	All MCs	302	1.0	302	1.0	0.360	6.2	LOS A	1.8	46.5	0.72	0.77	0.77	29.3
14	R2	All MCs	180	1.0	180	1.0	0.360	5.7	LOS A	1.8	46.5	0.72	0.76	0.76	23.1
Approach			494	1.0	494	1.0	0.360	6.1	LOS A	1.8	46.5	0.72	0.77	0.76	26.5
West: Custer Way															
5	L2	All MCs	101	1.0	101	1.0	0.665	11.1	LOS B	5.5	138.5	0.79	0.85	1.04	12.8
2	T1	All MCs	899	1.0	899	1.0	0.665	6.6	LOS A	5.5	138.5	0.79	0.85	1.04	23.2
12	R2	All MCs	124	1.0	124	1.0	0.665	7.4	LOS A	5.4	135.3	0.79	0.85	1.05	26.2
Approach			1124	1.0	1124	1.0	0.665	7.1	LOS A	5.5	138.5	0.79	0.85	1.04	22.5
All Vehicles			3427	1.0	3427	1.0	0.740	6.7	LOS A	6.0	152.4	0.75	0.74	0.91	24.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 24 [7: Custer Way/North St & Cleveland Ave (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Custer Way/North St & Cleveland Ave
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Cleveland Ave															
3	L2	All MCs	731	1.0	731	1.0	0.870	22.1	LOS D	13.9	350.8	1.00	1.16	1.70	22.9
8	T1	All MCs	108	1.0	108	1.0	0.242	8.4	LOS A	1.1	28.2	0.66	0.69	0.66	15.1
18	R2	All MCs	11	1.0	11	1.0	0.242	8.7	LOS A	1.1	28.2	0.66	0.69	0.66	26.4
Approach			849	1.0	849	1.0	0.870	20.2	LOS C	13.9	350.8	0.95	1.10	1.55	22.1
East: North St															
1	L2	All MCs	3	1.0	3	1.0	0.257	8.4	LOS A	1.4	34.9	0.73	0.51	0.73	26.6
6	T1	All MCs	180	1.0	180	1.0	0.257	3.3	LOS A	1.4	34.9	0.73	0.51	0.73	23.7
16	R2	All MCs	65	1.0	65	1.0	0.134	5.7	LOS A	0.6	15.0	0.69	0.70	0.69	22.5
Approach			247	1.0	247	1.0	0.257	4.0	LOS A	1.4	34.9	0.72	0.56	0.72	23.5
North: Cleveland Ave															
7	L2	All MCs	140	1.0	140	1.0	0.433	15.8	LOS B	3.4	86.0	0.96	0.85	1.05	20.4
4	T1	All MCs	258	1.0	258	1.0	0.433	9.4	LOS A	3.8	94.8	0.98	0.82	1.04	26.9
14	R2	All MCs	86	1.0	86	1.0	0.433	8.9	LOS A	3.8	94.8	0.99	0.80	1.04	22.0
Approach			484	1.0	484	1.0	0.433	11.2	LOS B	3.8	94.8	0.98	0.82	1.05	23.7
West: Custer Way															
5	L2	All MCs	65	1.0	65	1.0	0.575	8.6	LOS A	3.9	98.2	0.68	0.63	0.77	13.0
2	T1	All MCs	398	1.0	398	1.0	0.575	3.9	LOS A	3.9	98.2	0.68	0.63	0.77	23.6
12	R2	All MCs	946	1.0	946	1.0	0.940	12.2	LOS D	17.6	443.6	1.00	1.27	1.63	24.7
Approach			1409	1.0	1409	1.0	0.940	9.7	LOS A	17.6	443.6	0.90	1.06	1.35	23.8
All Vehicles			2989	1.0	2989	1.0	0.940	12.4	LOS B	17.6	443.6	0.91	0.99	1.30	23.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	119.7
Intersection LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	87	593	460	30	130	140
Future Vol, veh/h	87	593	460	30	130	140
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	102	698	541	35	153	165
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay, s/veh	186.2	80.2	23.9
HCM LOS	F	F	C

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	13%	48%
Vol Thru, %	94%	0%	52%
Vol Right, %	6%	87%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	490	680	270
LT Vol	0	87	130
Through Vol	460	0	140
RT Vol	30	593	0
Lane Flow Rate	576	800	318
Geometry Grp	1	1	1
Degree of Util (X)	1.044	1.346	0.627
Departure Headway (Hd)	7.417	6.223	8.142
Convergence, Y/N	Yes	Yes	Yes
Cap	496	592	448
Service Time	5.417	4.223	6.142
HCM Lane V/C Ratio	1.161	1.351	0.71
HCM Control Delay, s/veh	80.2	186.2	23.9
HCM Lane LOS	F	F	C
HCM 95th-tile Q	15.2	33.7	4.2

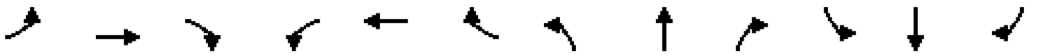
Intersection	
Int Delay, s/veh	17.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	110	200	170	70	220	330
Future Vol, veh/h	110	200	170	70	220	330
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	-	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	122	222	189	78	244	367

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1083	228	0	0	267	0
Stage 1	228	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Critical Hdwy	6.41	6.21	-	-	4.11	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	241	814	-	-	1303	-
Stage 1	812	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	196	814	-	-	1303	-
Mov Cap-2 Maneuver	196	-	-	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	340	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	56.9	0	3.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	384	1303	-
HCM Lane V/C Ratio	-	-	0.897	0.188	-
HCM Control Delay (s/veh)	-	-	56.9	8.4	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q (veh)	-	-	9.2	0.7	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	0	180	0	0	0	150	430	0	0	520	20
Future Volume (veh/h)	110	0	180	0	0	0	150	430	0	0	520	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		1.00	1.00		1.00	1.00		1.00	1.00		0.96
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	1885	1885	1885	1885	1885	1961	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	121	0	0	0	0	0	165	473	0	0	571	18
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	384	0		0	276		210	1974	0	4	1010	32
Arrive On Green	0.15	0.00	0.00	0.00	0.00	0.00	0.12	0.55	0.00	0.00	0.29	0.29
Sat Flow, veh/h	1408	0	1598	0	1885	1662	1795	3676	0	1795	3539	111
Grp Volume(v), veh/h	121	0	0	0	0	0	165	473	0	0	289	300
Grp Sat Flow(s),veh/h/ln	1408	0	1598	0	1885	1662	1795	1791	0	1795	1791	1859
Q Serve(g_s), s	3.2	0.0	0.0	0.0	0.0	0.0	3.6	2.8	0.0	0.0	5.5	5.6
Cycle Q Clear(g_c), s	3.2	0.0	0.0	0.0	0.0	0.0	3.6	2.8	0.0	0.0	5.5	5.6
Prop In Lane	1.00		1.00	0.00		1.00	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	384	0		0	276		210	1974	0	4	511	530
V/C Ratio(X)	0.31	0.00		0.00	0.00		0.79	0.24	0.00	0.00	0.57	0.57
Avail Cap(c_a), veh/h	1048	0		0	1164		223	1974	0	223	973	1010
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	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	16.1	0.0	0.0	0.0	0.0	0.0	17.3	4.7	0.0	0.0	12.3	12.3
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	15.9	0.1	0.0	0.0	1.0	1.0
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	1.0	0.0	0.0	0.0	0.0	0.0	2.2	0.5	0.0	0.0	1.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	16.5	0.0	0.0	0.0	0.0	0.0	33.3	4.7	0.0	0.0	13.3	13.2
LnGrp LOS	B						C	A			B	B
Approach Vol, veh/h		121			0			638			589	
Approach Delay, s/veh		16.5			0.0			12.1			13.2	
Approach LOS		B						B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	28.3		12.0	10.7	17.6		12.0				
Change Period (Y+Rc), s	6.0	6.1		6.1	6.0	6.1		6.1				
Max Green Setting (Gmax), s	5.0	21.9		24.9	5.0	21.9		24.9				
Max Q Clear Time (g_c+I1), s	0.0	4.8		5.2	5.6	7.6		0.0				
Green Ext Time (p_c), s	0.0	2.8		0.6	0.0	3.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay, s/veh		13.0	
HCM 6th LOS		B	

Notes

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

Intersection	
Int Delay, s/veh	17.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	150	0	0	300	290	0	0	0	270	0	10
Future Vol, veh/h	20	150	0	0	300	290	0	0	0	270	0	10
Conflicting Peds, #/hr	5	0	5	5	0	5	5	0	5	5	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	167	0	0	333	322	0	0	0	300	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	660	0	0	172	0	0	721	876	177	715	715	504
Stage 1	-	-	-	-	-	-	216	216	-	499	499	-
Stage 2	-	-	-	-	-	-	505	660	-	216	216	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	928	-	-	1405	-	-	343	287	866	346	356	568
Stage 1	-	-	-	-	-	-	786	724	-	554	544	-
Stage 2	-	-	-	-	-	-	549	460	-	786	724	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	924	-	-	1398	-	-	327	277	859	337	344	564
Mov Cap-2 Maneuver	-	-	-	-	-	-	327	277	-	337	344	-
Stage 1	-	-	-	-	-	-	762	702	-	537	542	-
Stage 2	-	-	-	-	-	-	536	458	-	763	702	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	1.1	0	0	63.9
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	924	-	-	1398	-	-	342
HCM Lane V/C Ratio	-	0.024	-	-	-	-	-	0.91
HCM Control Delay (s/veh)	0	9	0	-	0	-	-	63.9
HCM Lane LOS	A	A	A	-	A	-	-	F
HCM 95th %tile Q (veh)	-	0.1	-	-	0	-	-	9

MOVEMENT SUMMARY

Site: 24 [12: 2nd Ave & Linwood Ave (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

2nd Ave & Linwood Ave
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: 2nd Ave															
3	L2	All MCs	253	1.0	253	1.0	0.638	11.5	LOS B	6.0	152.3	0.78	0.74	0.90	24.6
8	T1	All MCs	165	1.0	165	1.0	0.638	6.2	LOS A	6.0	152.3	0.78	0.74	0.90	14.1
18	R2	All MCs	176	1.0	176	1.0	0.638	6.7	LOS A	6.0	152.3	0.78	0.74	0.90	24.7
Approach			593	1.0	593	1.0	0.638	8.6	LOS A	6.0	152.3	0.78	0.74	0.90	21.7
East: Linwood Ave															
1	L2	All MCs	176	1.0	176	1.0	0.493	8.7	LOS A	3.6	91.7	0.73	0.64	0.77	24.9
6	T1	All MCs	253	1.0	253	1.0	0.493	3.7	LOS A	3.6	91.7	0.73	0.64	0.77	23.4
16	R2	All MCs	1	1.0	1	1.0	0.493	4.6	LOS A	3.6	91.7	0.73	0.64	0.77	15.2
Approach			430	1.0	430	1.0	0.493	5.8	LOS A	3.6	91.7	0.73	0.64	0.77	23.9
North: 2nd Ave															
7	L2	All MCs	88	1.0	88	1.0	0.560	14.2	LOS B	4.7	119.2	0.85	0.84	1.04	24.2
4	T1	All MCs	197	1.0	197	1.0	0.560	8.9	LOS A	4.7	119.2	0.85	0.84	1.04	26.4
14	R2	All MCs	122	1.0	122	1.0	0.560	9.4	LOS A	4.7	119.2	0.85	0.84	1.04	24.3
Approach			407	1.0	407	1.0	0.560	10.2	LOS B	4.7	119.2	0.85	0.84	1.04	25.2
West: Linwood Ave															
5	L2	All MCs	22	1.0	22	1.0	0.538	9.5	LOS A	4.2	106.3	0.74	0.65	0.82	12.8
2	T1	All MCs	275	1.0	275	1.0	0.538	4.5	LOS A	4.2	106.3	0.74	0.65	0.82	23.6
12	R2	All MCs	176	1.0	176	1.0	0.538	5.3	LOS A	4.2	106.3	0.74	0.65	0.82	25.4
Approach			473	1.0	473	1.0	0.538	5.0	LOS A	4.2	106.3	0.74	0.65	0.82	23.7
All Vehicles			1902	1.0	1902	1.0	0.638	7.4	LOS A	6.0	152.3	0.77	0.72	0.88	23.4

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	0	160	0	0	0	140	390	0	0	580	270
Future Volume (veh/h)	280	0	160	0	0	0	140	390	0	0	580	270
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	1.00		1.00	1.00		1.00	1.00		0.97
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	286	0	61	0	0	0	143	398	0	0	592	211
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	537	0	344	141	419	0	384	1917	0	475	855	304
Arrive On Green	0.22	0.00	0.22	0.00	0.00	0.00	0.08	0.54	0.00	0.00	0.33	0.33
Sat Flow, veh/h	1783	0	1549	1352	1885	0	1795	3676	0	1795	2566	913
Grp Volume(v), veh/h	286	0	61	0	0	0	143	398	0	0	413	390
Grp Sat Flow(s),veh/h/ln	1783	0	1549	1352	1885	0	1795	1791	0	1795	1791	1688
Q Serve(g_s), s	7.6	0.0	1.6	0.0	0.0	0.0	2.4	3.0	0.0	0.0	10.2	10.3
Cycle Q Clear(g_c), s	7.6	0.0	1.6	0.0	0.0	0.0	2.4	3.0	0.0	0.0	10.2	10.3
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		0.54
Lane Grp Cap(c), veh/h	537	0	344	141	419	0	384	1917	0	475	596	562
V/C Ratio(X)	0.53	0.00	0.18	0.00	0.00	0.00	0.37	0.21	0.00	0.00	0.69	0.69
Avail Cap(c_a), veh/h	1355	0	1054	761	1283	0	582	3139	0	648	1394	1314
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	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	0.0	16.1	0.0	0.0	0.0	10.0	6.2	0.0	0.0	14.8	14.8
Incr Delay (d2), s/veh	0.6	0.0	0.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0	1.1	1.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.5	0.0	0.0	0.0	0.8	0.8	0.0	0.0	3.6	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.0	0.0	16.3	0.0	0.0	0.0	10.5	6.2	0.0	0.0	15.9	15.9
LnGrp LOS	B		B				B	A			B	B
Approach Vol, veh/h		347			0			541			803	
Approach Delay, s/veh		18.5			0.0			7.4			15.9	
Approach LOS		B						A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	33.6		17.6	10.3	23.2		17.6				
Change Period (Y+Rc), s	6.0	6.2		6.2	6.0	6.2		6.2				
Max Green Setting (Gmax), s	5.0	44.8		34.8	10.0	39.8		34.8				
Max Q Clear Time (g_c+I1), s	0.0	5.0		9.6	4.4	12.3		0.0				
Green Ext Time (p_c), s	0.0	2.2		0.9	0.1	4.4		0.0				

Intersection Summary			
HCM 6th Ctrl Delay, s/veh		13.7	
HCM 6th LOS		B	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	990	140	460	660	90	70	140	540	110	200	20
Future Volume (veh/h)	30	990	140	460	660	90	70	140	540	110	200	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.99		1.00	0.99		0.97
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	1885	1885	1885	1885	1885	1885	1885	1885	1961	1885	1885	1885
Adj Flow Rate, veh/h	32	1065	145	495	710	91	75	151	0	118	215	11
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	305	1160	158	523	2238	287	168	227		174	380	312
Arrive On Green	0.37	0.37	0.37	0.29	0.70	0.70	0.12	0.12	0.00	0.04	0.20	0.20
Sat Flow, veh/h	683	3151	428	1795	3181	407	1154	1885	1662	1795	1885	1548
Grp Volume(v), veh/h	32	604	606	495	399	402	75	151	0	118	215	11
Grp Sat Flow(s),veh/h/ln	683	1791	1789	1795	1791	1798	1154	1885	1662	1795	1885	1548
Q Serve(g_s), s	4.2	43.5	43.7	36.5	11.5	11.5	8.5	10.4	0.0	5.0	13.9	0.8
Cycle Q Clear(g_c), s	4.2	43.5	43.7	36.5	11.5	11.5	11.4	10.4	0.0	5.0	13.9	0.8
Prop In Lane	1.00		0.24	1.00		0.23	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	305	659	658	523	1260	1265	168	227		174	380	312
V/C Ratio(X)	0.11	0.92	0.92	0.95	0.32	0.32	0.45	0.67		0.68	0.57	0.04
Avail Cap(c_a), veh/h	314	683	683	544	1306	1311	264	385		174	538	442
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.3	40.8	40.8	46.9	7.6	7.6	58.7	56.9	0.0	54.6	48.6	43.4
Incr Delay (d2), s/veh	0.2	17.1	17.6	26.4	0.1	0.1	0.7	1.3	0.0	8.4	1.6	0.1
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	0.7	22.0	22.1	19.9	4.2	4.2	2.5	5.0	0.0	1.9	6.7	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	28.5	57.9	58.4	73.3	7.8	7.8	59.4	58.1	0.0	63.0	50.2	43.4
LnGrp LOS	C	E	E	E	A	A	E	E		E	D	D
Approach Vol, veh/h		1242			1296			226			344	
Approach Delay, s/veh		57.4			32.8			58.5			54.4	
Approach LOS		E			C			E			D	

Timer - Assigned Phs	2	3	4	5	6	8
Phs Duration (G+Y+Rc), s	101.5	11.0	22.7	45.4	56.2	33.7
Change Period (Y+Rc), s	6.4	6.0	6.4	6.0	6.4	6.4
Max Green Setting (Gmax), s	98.6	5.0	27.6	41.0	51.6	38.6
Max Q Clear Time (g_c+I1), s	13.5	7.0	13.4	38.5	45.7	15.9
Green Ext Time (p_c), s	5.8	0.0	0.5	0.9	4.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	46.9
HCM 6th LOS	D

Notes

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

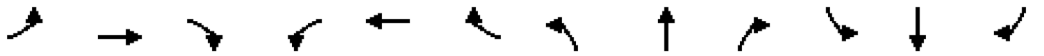
Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	150	300	140	120	80
Future Vol, veh/h	40	150	300	140	120	80
Conflicting Peds, #/hr	0	0	0	0	0	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	120
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	43	160	319	149	128	85

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	468	0	-	0	640	399
Stage 1	-	-	-	-	394	-
Stage 2	-	-	-	-	246	-
Critical Hdwy	4.11	-	-	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.209	-	-	-	3.509	3.309
Pot Cap-1 Maneuver	1099	-	-	-	441	653
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1099	-	-	-	422	650
Mov Cap-2 Maneuver	-	-	-	-	422	-
Stage 1	-	-	-	-	654	-
Stage 2	-	-	-	-	797	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.8	0	14.9
HCM LOS			B

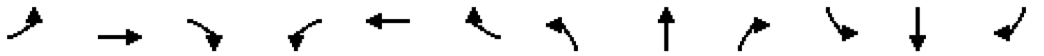
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1099	-	-	-	422	650
HCM Lane V/C Ratio	0.039	-	-	-	0.303	0.131
HCM Control Delay (s/veh)	8.4	0	-	-	17.2	11.4
HCM Lane LOS	A	A	-	-	C	B
HCM 95th %tile Q (veh)	0.1	-	-	-	1.3	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	250	0	0	400	60	0	0	0	20	0	10
Future Volume (veh/h)	0	250	0	0	400	60	0	0	0	20	0	10
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		0.97	1.00		1.00	0.97		0.96
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	0	263	0	0	421	57	0	0	0	21	0	6
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	652	2109	0	843	1110	917	212	98	0	303	0	80
Arrive On Green	0.00	0.59	0.00	0.00	0.59	0.59	0.00	0.00	0.00	0.05	0.00	0.05
Sat Flow, veh/h	1795	3676	0	1795	1885	1557	1421	1885	0	1744	0	1531
Grp Volume(v), veh/h	0	263	0	0	421	57	0	0	0	21	0	6
Grp Sat Flow(s),veh/h/ln	1795	1791	0	1795	1885	1557	1421	1885	0	1744	0	1531
Q Serve(g_s), s	0.0	1.1	0.0	0.0	4.0	0.5	0.0	0.0	0.0	0.4	0.0	0.1
Cycle Q Clear(g_c), s	0.0	1.1	0.0	0.0	4.0	0.5	0.0	0.0	0.0	0.4	0.0	0.1
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	652	2109	0	843	1110	917	212	98	0	303	0	80
V/C Ratio(X)	0.00	0.12	0.00	0.00	0.38	0.06	0.00	0.00	0.00	0.07	0.00	0.08
Avail Cap(c_a), veh/h	911	3680	0	1102	1937	1600	761	827	0	977	0	672
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	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	3.1	0.0	0.0	3.7	3.0	0.0	0.0	0.0	15.4	0.0	15.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
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	0.2	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	3.1	0.0	0.0	3.8	3.0	0.0	0.0	0.0	15.5	0.0	15.5
LnGrp LOS		A			A	A				B		B
Approach Vol, veh/h		263			478			0			27	
Approach Delay, s/veh		3.1			3.7			0.0			15.5	
Approach LOS		A			A						B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	26.1		7.9	0.0	26.1		7.9				
Change Period (Y+Rc), s	6.0	6.1		6.1	6.0	6.1		6.1				
Max Green Setting (Gmax), s	5.0	34.9		14.9	5.0	34.9		14.9				
Max Q Clear Time (g_c+I1), s	0.0	6.0		0.0	0.0	3.1		2.4				
Green Ext Time (p_c), s	0.0	2.0		0.0	0.0	1.2		0.0				

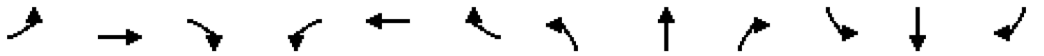
Intersection Summary		
HCM 6th Ctrl Delay, s/veh		3.9
HCM 6th LOS		A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	200	110	277	254	59	204	295	381	130	290	60
Future Volume (vph)	40	200	110	277	254	59	204	295	381	130	290	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	10	12	11	11	10	12	11	10	12	11	11
Total Lost time (s)	6.0	6.0		6.0	6.0		5.6	6.0	6.0	5.6	6.0	
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1752	3074		1542	3124		1752	1783	1452	1752	3290	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1752	3074		1542	3124		1752	1783	1452	1752	3290	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	40	202	111	280	257	60	206	298	385	131	293	61
RTOR Reduction (vph)	0	72	0	0	10	0	0	0	142	0	16	0
Lane Group Flow (vph)	40	241	0	196	391	0	206	298	243	131	338	0
Confl. Peds. (#/hr)	5		5	5		5	5		5	5		5
Confl. Bikes (#/hr)	2		2	2		2			2	2		
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Split	NA		Split	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	1		2	2		7	4	2	3	8	
Permitted Phases									4			
Actuated Green, G (s)	16.4	16.4		38.0	38.0		23.6	27.3	65.3	14.7	18.4	
Effective Green, g (s)	16.4	16.4		38.0	38.0		23.6	27.3	65.3	14.7	18.4	
Actuated g/C Ratio	0.14	0.14		0.32	0.32		0.20	0.23	0.54	0.12	0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0		5.6	6.0	6.0	5.6	6.0	
Vehicle Extension (s)	2.5	2.5		3.0	3.0		3.0	2.5	3.0	3.0	2.5	
Lane Grp Cap (vph)	239	420		488	989		344	405	862	214	504	
v/s Ratio Prot	0.02	c0.08		c0.13	0.13		c0.12	c0.17	0.09	0.07	0.10	
v/s Ratio Perm									0.08			
v/c Ratio	0.17	0.57		0.40	0.40		0.60	0.74	0.28	0.61	0.67	
Uniform Delay, d1	45.8	48.5		32.1	32.0		43.9	43.0	14.7	49.9	47.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	1.6		2.5	1.2		2.8	6.4	0.1	5.1	3.2	
Delay (s)	46.0	50.1		34.6	33.2		46.7	49.4	14.9	55.1	51.1	
Level of Service	D	D		C	C		D	D	B	E	D	
Approach Delay (s/veh)		49.6			33.6			33.8			52.2	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	40.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.6
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	560	10	190	219	181	40	140	260	351	362	367
Future Volume (vph)	190	560	10	190	219	181	40	140	260	351	362	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	11	12	16	11	11	11	13	13	16
Total Lost time (s)	4.6	4.6	4.6	4.6	4.6	4.0	4.6	4.6	4.6	4.6	4.6	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1694	3505	1515	1694	3505	1740	1694	1783	1516	1811	1906	1753
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1694	3505	1515	1694	3505	1740	1694	1783	1516	1811	1906	1753
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	194	571	10	194	223	185	41	143	265	358	369	374
RTOR Reduction (vph)	0	0	6	0	0	0	0	0	96	0	0	0
Lane Group Flow (vph)	194	571	4	194	223	185	41	143	169	358	369	374
Confl. Peds. (#/hr)			5	5			5					5
Confl. Bikes (#/hr)	2		2	2		2						
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Free	Split	NA	pt+ov	Split	NA	Free
Protected Phases	1	6		5	2		4	4	4 5	3	3	
Permitted Phases			6			Free						Free
Actuated Green, G (s)	20.8	50.3	50.3	20.9	50.4	140.0	16.6	16.6	42.1	33.8	33.8	140.0
Effective Green, g (s)	20.8	50.3	50.3	20.9	50.4	140.0	16.6	16.6	42.1	33.8	33.8	140.0
Actuated g/C Ratio	0.15	0.36	0.36	0.15	0.36	1.00	0.12	0.12	0.30	0.24	0.24	1.00
Clearance Time (s)	4.6	4.6	4.6	4.6	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	3.0	2.7	2.7	3.2	3.0		3.2	3.2		3.5	3.5	
Lane Grp Cap (vph)	251	1259	544	252	1261	1740	200	211	455	437	460	1753
v/s Ratio Prot	c0.11	c0.16		0.11	0.06		0.02	c0.08	0.11	c0.20	0.19	
v/s Ratio Perm			0.00			0.11						c0.21
v/c Ratio	0.77	0.45	0.01	0.77	0.18	0.11	0.21	0.68	0.37	0.82	0.80	0.21
Uniform Delay, d1	57.3	34.3	28.8	57.2	30.6	0.0	55.7	59.1	38.5	50.2	50.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.7	1.2	0.0	13.4	0.3	0.1	0.5	8.5	0.6	11.7	10.0	0.3
Delay (s)	71.1	35.5	28.8	70.6	30.9	0.1	56.3	67.6	39.1	61.9	59.9	0.3
Level of Service	E	D	C	E	C	A	E	E	D	E	E	A
Approach Delay (s/veh)		44.3			34.2			49.7			40.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	20	68	130	20	220	70	460	110	225	442	93
Future Volume (veh/h)	102	20	68	130	20	220	70	460	110	225	442	93
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.97	1.00		0.97
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	111	22	23	141	22	53	76	500	90	245	480	81
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	114	13	399	116	10	399	109	800	143	296	1127	189
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.06	0.27	0.27	0.16	0.37	0.37
Sat Flow, veh/h	0	50	1557	0	39	1557	1795	3018	540	1795	3054	512
Grp Volume(v), veh/h	133	0	23	163	0	53	76	296	294	245	280	281
Grp Sat Flow(s),veh/h/ln	50	0	1557	39	0	1557	1795	1791	1767	1795	1791	1775
Q Serve(g_s), s	0.0	0.0	0.6	0.0	0.0	1.5	2.4	8.4	8.5	7.7	6.8	6.9
Cycle Q Clear(g_c), s	14.9	0.0	0.6	14.9	0.0	1.5	2.4	8.4	8.5	7.7	6.8	6.9
Prop In Lane	0.83		1.00	0.87		1.00	1.00		0.31	1.00		0.29
Lane Grp Cap(c), veh/h	127	0	399	126	0	399	109	475	468	296	661	655
V/C Ratio(X)	1.05	0.00	0.06	1.30	0.00	0.13	0.70	0.62	0.63	0.83	0.42	0.43
Avail Cap(c_a), veh/h	127	0	399	126	0	399	216	645	636	340	768	761
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.5	0.0	16.3	27.8	0.0	16.6	26.7	18.8	18.8	23.4	13.7	13.7
Incr Delay (d2), s/veh	94.1	0.0	0.1	179.7	0.0	0.1	7.7	1.3	1.4	13.9	0.4	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	0.2	8.0	0.0	0.5	1.2	3.3	3.3	4.1	2.5	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	121.6	0.0	16.3	207.5	0.0	16.8	34.4	20.1	20.2	37.3	14.1	14.2
LnGrp LOS	F		B	F		B	C	C	C	D	B	B
Approach Vol, veh/h		156			216			666			806	
Approach Delay, s/veh		106.1			160.7			21.8			21.2	
Approach LOS		F			F			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.5	27.5		21.0	15.6	21.5		21.0
Change Period (Y+Rc), s	6.0	6.1		6.1	6.0	6.1		6.1
Max Green Setting (Gmax), s	7.0	24.9		14.9	11.0	20.9		14.9
Max Q Clear Time (g_c+I1), s	14.4	8.9		16.9	9.7	10.5		16.9
Green Ext Time (p_c), s	0.0	3.1		0.0	0.1	2.7		0.0

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		44.9
HCM 6th LOS		D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	0	50	1	3	26	30	540	0	20	690	80
Future Volume (veh/h)	110	0	50	1	3	26	30	540	0	20	690	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		1.00	1.00		0.97
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	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	121	0	24	1	3	4	33	593	0	22	758	83
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	80	0	398	50	109	398	60	1530	0	45	1360	149
Arrive On Green	0.28	0.00	0.28	0.28	0.28	0.28	0.07	0.96	0.00	0.06	0.94	0.94
Sat Flow, veh/h	0	0	1398	0	385	1398	1603	3282	0	1603	2898	317
Grp Volume(v), veh/h	121	0	24	4	0	4	33	593	0	22	418	423
Grp Sat Flow(s),veh/h/ln	0	0	1398	385	0	1398	1603	1599	0	1603	1599	1616
Q Serve(g_s), s	0.0	0.0	1.1	0.0	0.0	0.2	1.8	1.1	0.0	1.2	3.0	3.0
Cycle Q Clear(g_c), s	25.6	0.0	1.1	25.6	0.0	0.2	1.8	1.1	0.0	1.2	3.0	3.0
Prop In Lane	1.00		1.00	0.25		1.00	1.00		0.00	1.00		0.20
Lane Grp Cap(c), veh/h	80	0	398	159	0	398	60	1530	0	45	750	758
V/C Ratio(X)	1.51	0.00	0.06	0.03	0.00	0.01	0.55	0.39	0.00	0.49	0.56	0.56
Avail Cap(c_a), veh/h	80	0	398	159	0	398	107	1530	0	107	750	758
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	0.0	23.4	25.3	0.0	23.1	40.9	1.0	0.0	41.8	1.6	1.6
Incr Delay (d2), s/veh	284.5	0.0	0.0	0.0	0.0	0.0	2.9	0.7	0.0	3.0	3.0	2.9
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	8.1	0.0	0.4	0.1	0.0	0.1	0.7	0.4	0.0	0.5	1.1	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	329.5	0.0	23.5	25.3	0.0	23.1	43.8	1.8	0.0	44.8	4.5	4.5
LnGrp LOS	F		C	C		C	D	A		D	A	A
Approach Vol, veh/h		145			8			626			863	
Approach Delay, s/veh		278.8			24.2			4.0			5.6	
Approach LOS		F			C			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.5	49.5		32.0	9.4	48.6		32.0
Change Period (Y+Rc), s	6.0	6.4		6.4	6.0	6.4		6.4
Max Green Setting (Gmax), s	6.6	39.6		25.6	6.0	39.6		25.6
Max Q Clear Time (g_c+I1), s	3.2	3.1		27.6	3.8	5.0		27.6
Green Ext Time (p_c), s	0.0	4.3		0.0	0.0	5.9		0.0

Intersection Summary		
HCM 6th Ctrl Delay, s/veh		29.2
HCM 6th LOS		C

MOVEMENT SUMMARY

Site: 21 [21: Littlerock Rd & Kingswood Dr (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Littlerock Rd & Kingswood Dr
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Littlerock Rd															
8	T1	All MCs	353	1.0	353	1.0	0.355	2.3	LOS A	1.8	45.7	0.30	0.30	0.30	16.9
18	R2	All MCs	115	1.0	115	1.0	0.355	2.7	LOS A	1.8	45.7	0.30	0.30	0.30	28.4
Approach			468	1.0	468	1.0	0.355	2.4	LOS A	1.8	45.7	0.30	0.30	0.30	19.9
East: Kingswood Dr															
1	L2	All MCs	85	1.0	85	1.0	0.076	8.4	LOS A	0.4	9.3	0.44	0.62	0.44	26.4
16	R2	All MCs	170	1.0	170	1.0	0.118	3.5	LOS A	0.6	15.8	0.43	0.46	0.43	26.7
Approach			255	1.0	255	1.0	0.118	5.2	LOS A	0.6	15.8	0.43	0.51	0.43	26.6
North: Littlerock Rd															
7	L2	All MCs	138	1.0	138	1.0	0.125	6.9	LOS A	0.6	14.6	0.23	0.57	0.23	25.1
4	T1	All MCs	553	1.0	553	1.0	0.348	2.1	LOS A	2.2	54.2	0.25	0.29	0.25	27.7
Approach			691	1.0	691	1.0	0.348	3.1	LOS A	2.2	54.2	0.25	0.35	0.25	27.1
All Vehicles			1415	1.0	1415	1.0	0.355	3.2	LOS A	2.2	54.2	0.30	0.36	0.30	23.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 24 [22: Capitol Blvd & Dennis St (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Capitol Blvd & Dennis St
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Capitol Blvd															
3	L2	All MCs	11	3.0	11	3.0	0.450	9.6	LOS A	2.9	73.9	0.42	0.43	0.42	27.1
8	T1	All MCs	468	3.0	468	3.0	0.450	4.0	LOS A	2.9	73.9	0.42	0.43	0.42	15.5
18	R2	All MCs	21	3.0	21	3.0	0.450	4.3	LOS A	2.9	73.9	0.42	0.43	0.42	27.3
Approach			500	3.0	500	3.0	0.450	4.1	LOS A	2.9	73.9	0.42	0.43	0.42	16.2
East: Dennis St															
1	L2	All MCs	23	3.0	23	3.0	0.090	8.0	LOS A	0.4	11.5	0.56	0.55	0.56	26.6
6	T1	All MCs	20	3.0	20	3.0	0.090	3.0	LOS A	0.4	11.5	0.56	0.55	0.56	23.7
16	R2	All MCs	31	3.0	31	3.0	0.090	3.9	LOS A	0.4	11.5	0.56	0.55	0.56	17.4
Approach			74	3.0	74	3.0	0.090	4.9	LOS A	0.4	11.5	0.56	0.55	0.56	22.3
North: Capitol Blvd															
7	L2	All MCs	96	3.0	96	3.0	0.641	7.7	LOS A	6.5	165.2	0.38	0.39	0.38	23.7
4	T1	All MCs	617	3.0	617	3.0	0.641	2.7	LOS A	6.5	165.2	0.38	0.39	0.38	30.8
14	R2	All MCs	64	3.0	64	3.0	0.641	2.7	LOS A	6.5	165.2	0.38	0.39	0.38	23.9
Approach			777	3.0	777	3.0	0.641	3.3	LOS A	6.5	165.2	0.38	0.39	0.38	29.1
West: Dennis St															
5	L2	All MCs	21	3.0	21	3.0	0.111	10.0	LOS A	0.6	15.4	0.69	0.64	0.69	12.7
2	T1	All MCs	32	3.0	32	3.0	0.111	4.9	LOS A	0.6	15.4	0.69	0.64	0.69	23.3
12	R2	All MCs	21	3.0	21	3.0	0.111	5.8	LOS A	0.6	15.4	0.69	0.64	0.69	26.3
Approach			74	3.0	74	3.0	0.111	6.6	LOS A	0.6	15.4	0.69	0.64	0.69	20.9
All Vehicles			1426	3.0	1426	3.0	0.641	3.9	LOS A	6.5	165.2	0.42	0.42	0.42	21.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	50	1	109	10	660	80	90	629	1
Future Volume (veh/h)	0	0	0	50	1	109	10	660	80	90	629	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	0.98		0.96	1.00		0.97	1.00		0.97
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	1885	1961	1885	1885	1961	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	0	0	0	53	1	25	11	702	78	96	669	1
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	0	240	0	252	23	60	452	977	109	374	1107	2
Arrive On Green	0.00	0.00	0.00	0.12	0.12	0.12	0.59	0.59	0.59	0.59	0.59	0.59
Sat Flow, veh/h	0	1961	0	869	190	490	773	1661	185	698	1882	3
Grp Volume(v), veh/h	0	0	0	79	0	0	11	0	780	96	0	670
Grp Sat Flow(s),veh/h/ln	0	1961	0	1549	0	0	773	0	1845	698	0	1885
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.4	0.0	12.5	4.7	0.0	9.4
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.9	0.0	0.0	9.8	0.0	12.5	17.2	0.0	9.4
Prop In Lane	0.00		0.00	0.67		0.32	1.00		0.10	1.00		0.00
Lane Grp Cap(c), veh/h	0	240	0	335	0	0	452	0	1085	374	0	1108
V/C Ratio(X)	0.00	0.00	0.00	0.24	0.00	0.00	0.02	0.00	0.72	0.26	0.00	0.60
Avail Cap(c_a), veh/h	0	473	0	513	0	0	613	0	1469	519	0	1500
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	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	0.0	0.0	0.0	16.7	0.0	0.0	8.6	0.0	6.1	12.2	0.0	5.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	1.3	0.4	0.0	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.7	0.0	0.0	0.1	0.0	2.6	0.6	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	0.0	0.0	17.2	0.0	0.0	8.6	0.0	7.4	12.7	0.0	6.1
LnGrp LOS				B			A		A	B		A
Approach Vol, veh/h		0			79			791			766	
Approach Delay, s/veh		0.0			17.2			7.4			6.9	
Approach LOS					B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	30.4	11.1	30.4	11.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	33.0	10.0	33.0	10.0
Max Q Clear Time (g_c+I1), s	19.2	3.9	14.5	0.0
Green Ext Time (p_c), s	5.2	0.2	6.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	7.6
HCM 6th LOS	A

MOVEMENT SUMMARY

Site: 24 [24: Littlerock Rd & Israel Rd & 70th Ave (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Littlerock Rd & Israel Rd & 70th Ave
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Littlerock Rd															
3	L2	All MCs	196	1.0	196	1.0	0.477	10.2	LOS B	3.2	80.4	0.57	0.59	0.57	30.5
8	T1	All MCs	269	1.0	269	1.0	0.477	4.7	LOS A	3.2	80.4	0.57	0.59	0.57	20.3
18	R2	All MCs	62	1.0	62	1.0	0.477	5.0	LOS A	3.2	80.4	0.57	0.59	0.57	30.8
Approach			527	1.0	527	1.0	0.477	6.8	LOS A	3.2	80.4	0.57	0.59	0.57	25.7
East: Israel Rd															
1	L2	All MCs	119	1.0	119	1.0	0.283	10.4	LOS B	1.8	45.8	0.64	0.62	0.64	30.2
6	T1	All MCs	204	1.0	204	1.0	0.283	5.4	LOS A	1.8	45.8	0.64	0.62	0.64	30.7
16	R2	All MCs	171	1.0	171	1.0	0.193	6.0	LOS A	1.1	26.8	0.61	0.62	0.61	29.0
Approach			495	1.0	495	1.0	0.283	6.8	LOS A	1.8	45.8	0.63	0.62	0.63	30.2
North: Littlerock Rd															
7	L2	All MCs	140	1.0	140	1.0	0.539	10.7	LOS B	4.8	119.9	0.79	0.70	0.85	27.7
4	T1	All MCs	452	1.0	452	1.0	0.539	6.6	LOS A	4.8	119.9	0.79	0.70	0.85	28.3
14	R2	All MCs	194	1.0	194	1.0	0.253	6.2	LOS A	1.5	37.8	0.67	0.66	0.67	28.6
Approach			785	1.0	785	1.0	0.539	7.2	LOS A	4.8	119.9	0.76	0.69	0.81	28.3
West: 70th Ave															
5	L2	All MCs	75	1.0	75	1.0	0.184	10.9	LOS B	1.0	26.1	0.66	0.69	0.66	19.3
2	T1	All MCs	86	1.0	86	1.0	0.184	6.1	LOS A	1.0	26.1	0.66	0.69	0.66	30.3
12	R2	All MCs	151	1.0	151	1.0	0.192	7.1	LOS A	1.0	25.8	0.65	0.69	0.65	30.6
Approach			312	1.0	312	1.0	0.192	7.7	LOS A	1.0	26.1	0.66	0.69	0.66	28.0
All Vehicles			2118	1.0	2118	1.0	0.539	7.1	LOS A	4.8	119.9	0.67	0.65	0.68	27.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	450	110	150	420	40	200	50	70	20	140	80
Future Volume (veh/h)	70	450	110	150	420	40	200	50	70	20	140	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	0.99		0.96	0.97		0.95
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	1885	1885	1885	1885	1885	1885	1885	1961	1885	1885	1885	1885
Adj Flow Rate, veh/h	79	506	117	169	472	43	225	56	33	22	157	71
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	359	574	133	292	707	64	360	300	177	348	199	90
Arrive On Green	0.05	0.39	0.39	0.08	0.42	0.42	0.12	0.26	0.26	0.02	0.17	0.17
Sat Flow, veh/h	1795	1471	340	1795	1697	155	1795	1136	670	1795	1205	545
Grp Volume(v), veh/h	79	0	623	169	0	515	225	0	89	22	0	228
Grp Sat Flow(s),veh/h/ln	1795	0	1811	1795	0	1852	1795	0	1806	1795	0	1750
Q Serve(g_s), s	2.0	0.0	24.8	4.3	0.0	17.5	7.6	0.0	3.0	0.8	0.0	9.7
Cycle Q Clear(g_c), s	2.0	0.0	24.8	4.3	0.0	17.5	7.6	0.0	3.0	0.8	0.0	9.7
Prop In Lane	1.00		0.19	1.00		0.08	1.00		0.37	1.00		0.31
Lane Grp Cap(c), veh/h	359	0	707	292	0	772	360	0	477	348	0	289
V/C Ratio(X)	0.22	0.00	0.88	0.58	0.00	0.67	0.62	0.00	0.19	0.06	0.00	0.79
Avail Cap(c_a), veh/h	382	0	895	302	0	951	382	0	491	422	0	354
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	0.00	1.00
Uniform Delay (d), s/veh	14.3	0.0	22.0	17.1	0.0	18.3	22.0	0.0	22.1	25.8	0.0	31.1
Incr Delay (d2), s/veh	0.1	0.0	8.5	2.6	0.0	1.3	2.0	0.0	0.1	0.0	0.0	9.4
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	11.6	1.8	0.0	7.4	3.3	0.0	1.2	0.3	0.0	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	14.4	0.0	30.5	19.7	0.0	19.6	24.0	0.0	22.2	25.9	0.0	40.5
LnGrp LOS	B		C	B		B	C		C	C		D
Approach Vol, veh/h		702			684			314			250	
Approach Delay, s/veh		28.7			19.6			23.5			39.2	
Approach LOS		C			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	37.3	6.4	25.4	10.6	35.2	14.1	17.7
Change Period (Y+Rc), s	4.5	4.9	4.5	4.9	4.5	4.9	4.5	4.9
Max Green Setting (Gmax), s	5.1	39.9	5.1	21.1	6.6	38.4	10.5	15.7
Max Q Clear Time (g_c+I1), s	4.0	19.5	2.8	5.0	6.3	26.8	9.6	11.7
Green Ext Time (p_c), s	0.0	3.5	0.0	0.2	0.0	3.5	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	26.0
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	130	280	60	170	40	190	389	11	20	700	160
Future Volume (veh/h)	90	130	280	60	170	40	190	389	11	20	700	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.97	1.00		0.97
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	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	106	153	284	71	200	41	224	458	12	24	824	175
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	349	167	310	168	414	85	267	1417	37	398	965	205
Arrive On Green	0.06	0.32	0.32	0.05	0.31	0.31	0.10	0.45	0.45	0.03	0.37	0.37
Sat Flow, veh/h	1603	520	965	1603	1350	277	1603	3181	83	1603	2609	554
Grp Volume(v), veh/h	106	0	437	71	0	241	224	230	240	24	505	494
Grp Sat Flow(s),veh/h/ln	1603	0	1485	1603	0	1626	1603	1599	1666	1603	1599	1564
Q Serve(g_s), s	5.2	0.0	33.0	3.5	0.0	14.0	9.6	10.8	10.9	1.1	33.9	33.9
Cycle Q Clear(g_c), s	5.2	0.0	33.0	3.5	0.0	14.0	9.6	10.8	10.9	1.1	33.9	33.9
Prop In Lane	1.00		0.65	1.00		0.17	1.00		0.05	1.00		0.35
Lane Grp Cap(c), veh/h	349	0	476	168	0	499	267	712	742	398	592	578
V/C Ratio(X)	0.30	0.00	0.92	0.42	0.00	0.48	0.84	0.32	0.32	0.06	0.85	0.85
Avail Cap(c_a), veh/h	369	0	564	181	0	587	343	890	927	437	734	717
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	0.0	38.1	30.1	0.0	32.8	25.5	20.9	20.9	21.5	33.8	33.8
Incr Delay (d2), s/veh	0.6	0.0	18.6	2.0	0.0	0.9	14.2	0.3	0.3	0.1	8.5	8.7
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	2.1	0.0	14.4	1.4	0.0	5.7	4.5	4.0	4.2	0.4	14.1	13.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.5	0.0	56.7	32.1	0.0	33.7	39.6	21.2	21.2	21.5	42.3	42.4
LnGrp LOS	C		E	C		C	D	C	C	C	D	D
Approach Vol, veh/h		543			312			694			1023	
Approach Delay, s/veh		50.8			33.3			27.2			41.9	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	56.6	9.9	42.1	16.5	47.9	11.5	40.5
Change Period (Y+Rc), s	4.5	4.8	4.5	4.8	4.5	4.8	4.5	4.8
Max Green Setting (Gmax), s	6.1	64.8	6.3	44.2	17.5	53.4	8.5	42.0
Max Q Clear Time (g_c+I1), s	3.1	12.9	5.5	35.0	11.6	35.9	7.2	16.0
Green Ext Time (p_c), s	0.0	3.7	0.0	2.4	0.4	7.2	0.0	1.8

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	38.8
HCM 6th LOS	D

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	590	40	40	160	210	530
Future Volume (veh/h)	590	40	40	160	210	530
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.97	1.00			0.97
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	1885	1885	1885	1885	1885	1961
Adj Flow Rate, veh/h	634	41	43	172	226	366
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1
Cap, veh/h	688	44	195	205	494	421
Arrive On Green	0.41	0.41	0.11	0.11	0.26	0.26
Sat Flow, veh/h	1668	108	1795	1885	1885	1608
Grp Volume(v), veh/h	676	0	43	172	226	366
Grp Sat Flow(s),veh/h/ln	1779	0	1795	1885	1885	1608
Q Serve(g_s), s	29.9	0.0	1.8	7.4	8.3	18.0
Cycle Q Clear(g_c), s	29.9	0.0	1.8	7.4	8.3	18.0
Prop In Lane	0.94	0.06	1.00			1.00
Lane Grp Cap(c), veh/h	734	0	195	205	494	421
V/C Ratio(X)	0.92	0.00	0.22	0.84	0.46	0.87
Avail Cap(c_a), veh/h	794	0	195	205	591	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.1	0.0	33.8	36.3	25.7	29.2
Incr Delay (d2), s/veh	16.5	0.0	1.2	27.7	0.7	13.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.7	0.0	0.8	4.9	3.7	8.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	39.6	0.0	35.0	64.0	26.3	42.4
LnGrp LOS	D		C	E	C	D
Approach Vol, veh/h	676			215	592	
Approach Delay, s/veh	39.6			58.2	36.3	
Approach LOS	D			E	D	

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	40.2	27.7	15.0
Change Period (Y+Rc), s	6.0	6.0	6.0
Max Green Setting (Gmax), s	37.0	26.0	9.0
Max Q Clear Time (g_c+I1), s	31.9	20.0	9.4
Green Ext Time (p_c), s	2.3	1.4	0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	41.0
HCM 6th LOS	D

MOVEMENT SUMMARY

Site: 28 [28: Littlerock Rd & Tumwater Blvd (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Littlerock Rd & Tumwater Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Littlerock Rd															
8	T1	All MCs	228	1.0	228	1.0	0.158	3.3	LOS A	0.8	20.7	0.47	0.42	0.47	28.1
18	R2	All MCs	120	1.0	120	1.0	0.158	3.7	LOS A	0.8	20.7	0.46	0.45	0.46	28.0
Approach			348	1.0	348	1.0	0.158	3.5	LOS A	0.8	20.7	0.47	0.43	0.47	28.1
East: Tumwater Blvd															
1	L2	All MCs	250	1.0	250	1.0	0.221	8.0	LOS A	1.1	26.6	0.38	0.60	0.38	26.5
16	R2	All MCs	315	1.0	315	1.0	0.250	3.2	LOS A	1.3	31.6	0.38	0.44	0.38	28.2
Approach			565	1.0	565	1.0	0.250	5.3	LOS A	1.3	31.6	0.38	0.51	0.38	27.4
North: Littlerock Rd															
7	L2	All MCs	348	1.0	348	1.0	0.290	8.4	LOS A	1.8	46.3	0.49	0.59	0.49	26.4
4	T1	All MCs	391	1.0	391	1.0	0.272	2.9	LOS A	1.8	44.4	0.45	0.35	0.45	28.1
Approach			739	1.0	739	1.0	0.290	5.5	LOS A	1.8	46.3	0.47	0.46	0.47	27.3
All Vehicles			1652	1.0	1652	1.0	0.290	5.0	LOS A	1.8	46.3	0.44	0.47	0.44	27.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 24 [29: Tumwater Boulevard & I-5 SB Ramp (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Tumwater Boulevard & I-5 SB Ramp
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: Tumwater Blvd															
1	L2	All MCs	447	2.0	447	2.0	0.297	8.5	LOS A	0.0	0.0	0.00	0.64	0.00	33.3
6	T1	All MCs	328	2.0	328	2.0	0.241	3.1	LOS A	0.0	0.0	0.00	0.33	0.00	33.1
Approach			775	2.0	775	2.0	0.297	6.2	LOS A	0.0	0.0	0.00	0.51	0.00	33.2
North: I-5 SB Off-Ramp															
7	L2	All MCs	596	2.0	596	2.0	0.622	12.6	LOS B	4.0	101.0	0.67	0.90	0.88	26.2
14	R2	All MCs	427	2.0	427	2.0	0.521	7.0	LOS A	2.7	69.3	0.63	0.80	0.78	29.0
Approach			1022	2.0	1022	2.0	0.622	10.3	LOS B	4.0	101.0	0.65	0.86	0.84	27.2
West: Tumwater Blvd															
2	T1	All MCs	371	2.0	371	2.0	0.347	12.3	LOS B	2.6	66.2	0.93	0.79	0.93	29.1
12	R2	All MCs	360	2.0	360	2.0	0.321	5.7	LOS A	1.9	47.2	0.57	0.58	0.57	35.0
Approach			730	2.0	730	2.0	0.347	9.1	LOS A	2.6	66.2	0.75	0.69	0.75	31.7
All Vehicles			2528	2.0	2528	2.0	0.622	8.7	LOS A	4.0	101.0	0.48	0.70	0.56	30.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 24 [30: Tumwater Boulevard & I-5 NB Ramp (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Tumwater Boulevard & I-5 NB Ramp
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: I-5 NB Off-Ramp															
3	L2	All MCs	135	2.0	135	2.0	0.186	13.9	LOS B	0.6	16.0	0.54	0.82	0.54	31.2
18	R2	All MCs	214	2.0	214	2.0	0.241	7.9	LOS A	0.9	22.0	0.54	0.73	0.54	33.9
Approach			349	2.0	349	2.0	0.241	10.2	LOS B	0.9	22.0	0.54	0.76	0.54	32.8
East: Tumwater Blvd															
6	T1	All MCs	639	2.0	639	2.0	0.567	6.2	LOS A	4.7	120.3	0.70	0.63	0.77	31.3
16	R2	All MCs	1169	2.0	1169	2.0	0.712	3.4	LOS A	0.0	0.0	0.00	0.39	0.00	31.2
Approach			1807	2.0	1807	2.0	0.712	4.4	LOS A	4.7	120.3	0.25	0.48	0.27	31.2
West: Tumwater Blvd															
5	L2	All MCs	289	2.0	289	2.0	0.331	8.4	LOS A	0.0	0.0	0.00	0.56	0.00	20.1
2	T1	All MCs	675	2.0	675	2.0	0.331	3.2	LOS A	0.0	0.0	0.00	0.40	0.00	32.6
Approach			964	2.0	964	2.0	0.331	4.8	LOS A	0.0	0.0	0.00	0.45	0.00	29.0
All Vehicles			3120	2.0	3120	2.0	0.712	5.1	LOS A	4.7	120.3	0.20	0.50	0.22	30.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	478	115	70	910	70	140	90	60	110	109	331
Future Volume (veh/h)	87	478	115	70	910	70	140	90	60	110	109	331
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	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	106	583	134	85	1110	41	171	110	17	134	133	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	791	181	277	1292	572	168	228	188	190	259	
Arrive On Green	0.07	0.28	0.28	0.16	0.36	0.36	0.09	0.12	0.12	0.11	0.14	0.00
Sat Flow, veh/h	3456	2865	657	1781	3554	1574	1781	1870	1541	1781	1870	1585
Grp Volume(v), veh/h	106	361	356	85	1110	41	171	110	17	134	133	0
Grp Sat Flow(s),veh/h/ln	1728	1777	1745	1781	1777	1574	1781	1870	1541	1781	1870	1585
Q Serve(g_s), s	2.2	13.7	13.8	3.1	21.4	0.7	7.0	4.1	0.7	5.4	4.9	0.0
Cycle Q Clear(g_c), s	2.2	13.7	13.8	3.1	21.4	0.7	7.0	4.1	0.7	5.4	4.9	0.0
Prop In Lane	1.00		0.38	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	490	482	277	1292	572	168	228	188	190	259	
V/C Ratio(X)	0.43	0.74	0.74	0.31	0.86	0.07	1.02	0.48	0.09	0.70	0.51	
Avail Cap(c_a), veh/h	280	664	652	277	1375	609	168	749	617	264	850	
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.0	24.4	24.4	27.8	21.8	4.9	33.6	30.4	28.9	32.0	29.6	0.0
Incr Delay (d2), s/veh	1.4	3.2	3.4	0.8	5.6	0.1	74.0	1.9	0.2	5.9	1.9	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	0.9	5.8	5.7	1.3	9.1	0.4	6.4	1.9	0.3	2.5	2.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.4	27.6	27.8	28.5	27.4	5.0	107.6	32.3	29.1	37.9	31.5	0.0
LnGrp LOS	C	C	C	C	C	A	F	C	C	D	C	
Approach Vol, veh/h		823			1236			298			267	
Approach Delay, s/veh		28.6			26.8			75.3			34.7	
Approach LOS		C			C			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.3	33.3	14.2	15.4	17.8	26.8	13.0	16.6
Change Period (Y+Rc), s	6.0	6.3	6.3	* 6.3	6.3	* 6.3	6.0	6.3
Max Green Setting (Gmax), s	6.0	28.7	11.0	* 30	7.0	* 28	7.0	33.7
Max Q Clear Time (g_c+I1), s	4.2	23.4	7.4	6.1	5.1	15.8	9.0	6.9
Green Ext Time (p_c), s	0.1	3.5	0.1	0.7	0.0	4.0	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	33.7
HCM 6th LOS	C

Notes

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

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

MOVEMENT SUMMARY

Site: 32 [32: Tumwater Blvd & New Market St (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Tumwater Blvd & New Market St
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: New Market St															
3	L2	All MCs	21	2.0	21	2.0	0.027	6.0	LOS A	0.1	2.5	0.44	0.47	0.44	26.5
8	T1	All MCs	11	2.0	11	2.0	0.027	1.2	LOS A	0.1	2.5	0.44	0.47	0.44	23.6
18	R2	All MCs	21	2.0	21	2.0	0.023	2.1	LOS A	0.1	2.0	0.46	0.39	0.46	27.8
Approach			53	2.0	53	2.0	0.027	3.5	LOS A	0.1	2.5	0.45	0.43	0.45	26.3
East: Tumwater Blvd															
1	L2	All MCs	85	2.0	85	2.0	0.337	9.1	LOS A	2.1	53.6	0.23	0.33	0.23	27.7
6	T1	All MCs	947	2.0	947	2.0	0.337	2.2	LOS A	2.1	54.3	0.21	0.28	0.21	32.9
16	R2	All MCs	32	2.0	32	2.0	0.337	2.9	LOS A	2.1	54.3	0.21	0.25	0.21	28.2
Approach			1064	2.0	1064	2.0	0.337	2.7	LOS A	2.1	54.3	0.22	0.28	0.22	32.3
North: New Market St															
7	L2	All MCs	43	2.0	43	2.0	0.054	7.4	LOS A	0.2	4.9	0.54	0.70	0.54	25.9
4	T1	All MCs	1	2.0	1	2.0	0.054	2.5	LOS A	0.2	4.9	0.54	0.70	0.54	23.2
14	R2	All MCs	85	2.0	85	2.0	0.078	2.3	LOS A	0.3	7.6	0.53	0.42	0.53	27.6
Approach			129	2.0	129	2.0	0.078	4.0	LOS A	0.3	7.6	0.53	0.51	0.53	27.0
West: Tumwater Blvd															
5	L2	All MCs	28	2.0	28	2.0	0.242	9.4	LOS A	1.4	35.9	0.32	0.32	0.32	27.7
2	T1	All MCs	614	2.0	614	2.0	0.242	2.5	LOS A	1.4	36.7	0.31	0.31	0.31	32.7
12	R2	All MCs	82	2.0	82	2.0	0.242	3.2	LOS A	1.4	36.7	0.30	0.29	0.30	27.9
Approach			723	2.0	723	2.0	0.242	2.8	LOS A	1.4	36.7	0.31	0.31	0.31	31.9
All Vehicles			1969	2.0	1969	2.0	0.337	2.9	LOS A	2.1	54.3	0.28	0.31	0.28	31.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	246	334	20	340	50	282	458	30	100	640	310
Future Volume (veh/h)	50	246	334	20	340	50	282	458	30	100	640	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
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	56	273	187	22	378	50	313	509	31	111	711	161
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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	102	421	489	53	623	82	302	1042	63	142	1061	464
Arrive On Green	0.06	0.23	0.23	0.03	0.20	0.20	0.09	0.31	0.31	0.08	0.30	0.30
Sat Flow, veh/h	1781	1870	1553	1781	3149	413	3456	3399	207	1781	3554	1554
Grp Volume(v), veh/h	56	273	187	22	212	216	313	266	274	111	711	161
Grp Sat Flow(s),veh/h/ln	1781	1870	1553	1781	1777	1785	1728	1777	1828	1781	1777	1554
Q Serve(g_s), s	2.1	9.1	6.5	0.8	7.4	7.6	6.0	8.4	8.4	4.2	12.0	5.6
Cycle Q Clear(g_c), s	2.1	9.1	6.5	0.8	7.4	7.6	6.0	8.4	8.4	4.2	12.0	5.6
Prop In Lane	1.00		1.00	1.00		0.23	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	102	421	489	53	352	353	302	545	560	142	1061	464
V/C Ratio(X)	0.55	0.65	0.38	0.41	0.60	0.61	1.04	0.49	0.49	0.78	0.67	0.35
Avail Cap(c_a), veh/h	156	810	811	156	770	773	302	744	765	156	1488	651
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	24.1	18.4	32.7	25.0	25.1	31.3	19.4	19.4	31.0	21.1	18.8
Incr Delay (d2), s/veh	1.7	1.7	0.5	1.9	1.7	1.7	61.1	0.8	0.8	20.9	0.9	0.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	3.9	2.2	0.4	3.1	3.2	4.9	3.3	3.4	2.5	4.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	33.1	25.8	18.9	34.5	26.7	26.8	92.4	20.2	20.2	51.9	22.0	19.4
LnGrp LOS	C	C	B	C	C	C	F	C	C	D	C	B
Approach Vol, veh/h		516			450			853			983	
Approach Delay, s/veh		24.1			27.1			46.7			24.9	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	27.3	8.1	21.7	12.0	26.8	9.9	19.9
Change Period (Y+Rc), s	6.0	6.3	6.0	6.3	6.0	6.3	6.0	6.3
Max Green Setting (Gmax), s	6.0	28.7	6.0	29.7	6.0	28.7	6.0	29.7
Max Q Clear Time (g_c+I1), s	10.2	10.4	2.8	11.1	8.0	14.0	4.1	9.6
Green Ext Time (p_c), s	0.0	3.5	0.0	2.1	0.0	5.4	0.0	2.4

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	31.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	1	20	1	2	27	34	214	2	30	420	230
Future Volume (veh/h)	99	1	20	1	2	27	34	214	2	30	420	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	0.98		0.96	1.00		0.99	1.00		0.99
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	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	108	1	11	1	2	7	37	233	2	33	457	239
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, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	338	18	198	335	49	173	281	846	7	636	524	274
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.03	0.45	0.45	0.03	0.45	0.45
Sat Flow, veh/h	1392	130	1426	1389	355	1243	1795	1866	16	1795	1163	608
Grp Volume(v), veh/h	108	0	12	1	0	9	37	0	235	33	0	696
Grp Sat Flow(s),veh/h/ln	1392	0	1555	1389	0	1598	1795	0	1882	1795	0	1772
Q Serve(g_s), s	3.5	0.0	0.3	0.0	0.0	0.2	0.5	0.0	3.7	0.5	0.0	16.9
Cycle Q Clear(g_c), s	3.7	0.0	0.3	0.3	0.0	0.2	0.5	0.0	3.7	0.5	0.0	16.9
Prop In Lane	1.00		0.92	1.00		0.78	1.00		0.01	1.00		0.34
Lane Grp Cap(c), veh/h	338	0	216	335	0	222	281	0	853	636	0	798
V/C Ratio(X)	0.32	0.00	0.06	0.00	0.00	0.04	0.13	0.00	0.28	0.05	0.00	0.87
Avail Cap(c_a), veh/h	701	0	621	697	0	638	374	0	1147	734	0	1080
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	0.00	1.00
Uniform Delay (d), s/veh	19.3	0.0	17.8	17.9	0.0	17.7	9.7	0.0	8.1	6.7	0.0	11.8
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	4.9
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	1.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	1.1	0.1	0.0	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.5	0.0	17.8	17.9	0.0	17.8	9.7	0.0	8.2	6.7	0.0	16.8
LnGrp LOS	B		B	B		B	A		A	A		B
Approach Vol, veh/h		120			10			272			729	
Approach Delay, s/veh		19.4			17.8			8.4			16.3	
Approach LOS		B			B			A			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.5	27.4		12.6	7.4	27.6		12.6
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	4.0	29.0		19.0	4.0	29.0		19.0
Max Q Clear Time (g_c+I1), s	2.5	18.9		2.3	2.5	5.7		5.7
Green Ext Time (p_c), s	0.0	2.4		0.0	0.0	0.8		0.1

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	14.7
HCM 6th LOS	B

MOVEMENT SUMMARY

Site: 24 [35: Old Hwy 99 & Henderson Blvd (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Old Hwy 99 & Henderson Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Old Hwy 99 SE															
3	L2	All MCs	1	2.0	1	2.0	0.656	10.5	LOS B	7.3	184.9	0.54	0.44	0.54	28.0
8	T1	All MCs	681	2.0	681	2.0	0.656	4.9	LOS A	7.3	184.9	0.54	0.44	0.54	34.9
18	R2	All MCs	85	2.0	85	2.0	0.656	4.9	LOS A	7.3	184.9	0.54	0.44	0.54	32.9
Approach			767	2.0	767	2.0	0.656	4.9	LOS A	7.3	184.9	0.54	0.44	0.54	34.6
East: Henderson Blvd SE															
1	L2	All MCs	128	2.0	128	2.0	0.280	12.8	LOS B	1.7	42.7	0.75	0.74	0.75	30.4
6	T1	All MCs	1	2.0	1	2.0	0.280	7.3	LOS A	1.7	42.7	0.75	0.74	0.75	25.7
16	R2	All MCs	64	2.0	64	2.0	0.280	7.6	LOS A	1.7	42.7	0.75	0.74	0.75	30.8
Approach			193	2.0	193	2.0	0.280	11.1	LOS B	1.7	42.7	0.75	0.74	0.75	30.5
North: Capitol Blvd SE															
7	L2	All MCs	85	2.0	85	2.0	0.943	17.2	LOS D	26.5	671.9	1.00	0.84	1.16	30.4
4	T1	All MCs	979	2.0	979	2.0	0.943	11.6	LOS D	26.5	671.9	1.00	0.84	1.16	32.4
14	R2	All MCs	1	2.0	1	2.0	0.943	11.6	LOS D	26.5	671.9	1.00	0.84	1.16	26.6
Approach			1065	2.0	1065	2.0	0.943	12.0	LOS B	26.5	671.9	1.00	0.84	1.16	32.2
West: Driveway															
5	L2	All MCs	1	2.0	1	2.0	0.012	17.7	LOS B	0.1	2.0	0.97	0.72	0.97	24.7
2	T1	All MCs	1	2.0	1	2.0	0.012	12.7	LOS B	0.1	2.0	0.97	0.72	0.97	24.2
12	R2	All MCs	1	2.0	1	2.0	0.012	13.5	LOS B	0.1	2.0	0.97	0.72	0.97	25.0
Approach			3	2.0	3	2.0	0.012	14.6	LOS B	0.1	2.0	0.97	0.72	0.97	24.6
All Vehicles			2028	2.0	2028	2.0	0.943	9.2	LOS A	26.5	671.9	0.80	0.68	0.89	32.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	213	0	37	20	0	0	6	416	18	0	770	150
Future Volume (veh/h)	213	0	37	20	0	0	6	416	18	0	770	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	0.99		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	1885	1961	1885	1885	1961	1885	1885	1885	1885	1885	1885	1961
Adj Flow Rate, veh/h	248	0	10	23	0	0	7	484	-179	0	895	119
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	430	0	341	425	0	0	194	1021	0	123	1021	896
Arrive On Green	0.21	0.00	0.21	0.21	0.00	0.00	0.54	0.54	0.00	0.00	0.54	0.54
Sat Flow, veh/h	1413	0	1603	1422	0	0	560	1885	0	1083	1885	1654
Grp Volume(v), veh/h	248	0	10	23	0	0	7	305	0	0	895	119
Grp Sat Flow(s),veh/h/ln	1413	0	1603	1422	0	0	560	1885	0	1083	1885	1654
Q Serve(g_s), s	8.5	0.0	0.3	0.7	0.0	0.0	0.6	5.2	0.0	0.0	24.3	2.1
Cycle Q Clear(g_c), s	9.5	0.0	0.3	1.0	0.0	0.0	24.9	5.2	0.0	0.0	24.3	2.1
Prop In Lane	1.00		1.00	1.00		0.00	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	430	0	341	425	0	0	194	1021	0	123	1021	896
V/C Ratio(X)	0.58	0.00	0.03	0.05	0.00	0.00	0.04	0.30	0.00	0.00	0.88	0.13
Avail Cap(c_a), veh/h	611	0	547	612	0	0	279	1305	0	286	1305	1145
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	0.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	21.8	0.0	18.3	18.7	0.0	0.0	22.6	7.3	0.0	0.0	11.7	6.6
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.0	5.7	0.1
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	2.8	0.0	0.1	0.2	0.0	0.0	0.1	1.4	0.0	0.0	7.9	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.0	0.0	18.3	18.7	0.0	0.0	22.7	7.5	0.0	0.0	17.5	6.7
LnGrp LOS	C		B	B			C	A			B	A
Approach Vol, veh/h		258			23			312			1014	
Approach Delay, s/veh		22.8			18.7			7.8			16.2	
Approach LOS		C			B			A			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	39.0	19.7	39.0	19.7
Change Period (Y+Rc), s	7.2	7.2	7.2	7.2
Max Green Setting (Gmax), s	40.6	20.0	40.6	20.0
Max Q Clear Time (g_c+I1), s	26.9	11.5	26.3	3.0
Green Ext Time (p_c), s	1.3	0.5	5.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	15.7
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	260	60	163	147	0	0	0	0	420	0	500
Future Volume (veh/h)	0	260	60	163	147	0	0	0	0	420	0	500
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		0.98
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	0	1826	1826	1826	1826	0				1826	1899	1826
Adj Flow Rate, veh/h	0	295	25	185	167	0				477	0	231
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	533	452	490	895	0				598	0	500
Arrive On Green	0.00	0.29	0.29	0.11	0.49	0.00				0.33	0.00	0.33
Sat Flow, veh/h	0	1826	1547	1739	1826	0				1809	0	1513
Grp Volume(v), veh/h	0	295	25	185	167	0				477	0	231
Grp Sat Flow(s),veh/h/ln	0	1826	1547	1739	1826	0				1809	0	1513
Q Serve(g_s), s	0.0	7.0	0.6	3.4	2.6	0.0				12.3	0.0	6.2
Cycle Q Clear(g_c), s	0.0	7.0	0.6	3.4	2.6	0.0				12.3	0.0	6.2
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	533	452	490	895	0				598	0	500
V/C Ratio(X)	0.00	0.55	0.06	0.38	0.19	0.00				0.80	0.00	0.46
Avail Cap(c_a), veh/h	0	726	615	518	1117	0				860	0	719
HCM Platoon Ratio	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	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	15.3	13.1	10.0	7.3	0.0				15.6	0.0	13.6
Incr Delay (d2), s/veh	0.0	0.9	0.1	0.5	0.1	0.0				3.5	0.0	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
%ile BackOfQ(50%),veh/ln	0.0	2.5	0.2	1.0	0.7	0.0				4.4	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	0.0	16.2	13.1	10.5	7.4	0.0				19.1	0.0	14.2
LnGrp LOS		B	B	B	A					B		B
Approach Vol, veh/h		320			352						708	
Approach Delay, s/veh		16.0			9.0						17.5	
Approach LOS		B			A						B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.2	19.6		21.6		29.8
Change Period (Y+Rc), s	4.6	4.6		4.6		4.6
Max Green Setting (Gmax), s	6.4	20.4		24.4		31.4
Max Q Clear Time (g_c+I1), s	5.4	9.0		14.3		4.6
Green Ext Time (p_c), s	0.0	1.2		2.7		0.8

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	15.0
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	490	0	0	260	370	30	0	100	0	0	0
Future Volume (veh/h)	200	490	0	0	260	370	30	0	100	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98			
Parking Bus, Adj	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				
Adj Sat Flow, veh/h/ln	1826	1826	0	0	1826	1826	1826	1899	1826			
Adj Flow Rate, veh/h	225	551	0	0	292	0	34	0	20			
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89			
Percent Heavy Veh, %	5	5	0	0	5	5	5	5	5			
Cap, veh/h	721	1156	0	0	585		130	0	109			
Arrive On Green	0.16	0.63	0.00	0.00	0.32	0.00	0.07	0.00	0.07			
Sat Flow, veh/h	1739	1826	0	0	1826	1547	1809	0	1510			
Grp Volume(v), veh/h	225	551	0	0	292	0	34	0	20			
Grp Sat Flow(s),veh/h/ln	1739	1826	0	0	1826	1547	1809	0	1510			
Q Serve(g_s), s	2.1	4.9	0.0	0.0	4.0	0.0	0.6	0.0	0.4			
Cycle Q Clear(g_c), s	2.1	4.9	0.0	0.0	4.0	0.0	0.6	0.0	0.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	721	1156	0	0	585		130	0	109			
V/C Ratio(X)	0.31	0.48	0.00	0.00	0.50		0.26	0.00	0.18			
Avail Cap(c_a), veh/h	1683	4812	0	0	3232		1299	0	1085			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	4.4	3.0	0.0	0.0	8.6	0.0	13.7	0.0	13.6			
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	0.2	0.0	0.4	0.0	0.3			
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.0	0.9	0.0	0.2	0.0	0.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	4.6	3.1	0.0	0.0	8.8	0.0	14.1	0.0	13.9			
LnGrp LOS	A	A			A		B		B			
Approach Vol, veh/h		776			292			54				
Approach Delay, s/veh		3.6			8.8			14.0				
Approach LOS		A			A			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		24.3			9.7	14.6		6.8				
Change Period (Y+Rc), s		4.6			4.6	4.6		4.6				
Max Green Setting (Gmax), s		82.2			22.4	55.2		22.4				
Max Q Clear Time (g_c+I1), s		6.9			4.1	6.0		2.6				
Green Ext Time (p_c), s		1.1			0.6	0.5		0.0				

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	5.4
HCM 6th LOS	A

Notes

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

Intersection	
Int Delay, s/veh	66.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	350	170	104	336	170	80
Future Vol, veh/h	350	170	104	336	170	80
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	79	79	79	79	79	79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	443	215	132	425	215	101

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	658	0	1240	551
Stage 1	-	-	-	-	551	-
Stage 2	-	-	-	-	689	-
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	-	-	930	-	~ 193	534
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	498	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	930	-	~ 157	534
Mov Cap-2 Maneuver	-	-	-	-	~ 157	-
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	405	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	2.2	$ 316.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	203	-	-	930	-
HCM Lane V/C Ratio	1.559	-	-	0.142	-
HCM Control Delay (s/veh)	$ 316.6	-	-	9.5	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q (veh)	20.1	-	-	0.5	-

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

Intersection	
Int Delay, s/veh	9.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	640	50	120	310	60	230
Future Vol, veh/h	640	50	120	310	60	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	435	400	-	220	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	771	60	145	373	72	277

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	831	0	1434	771
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	663	-
Critical Hdwy	-	-	4.11	-	6.41	6.21
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	-	-	2.209	-	3.509	3.309
Pot Cap-1 Maneuver	-	-	806	-	148	402
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	514	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	806	-	121	402
Mov Cap-2 Maneuver	-	-	-	-	121	-
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	421	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	2.9	39.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	121	402	-	-	806	-
HCM Lane V/C Ratio	0.597	0.689	-	-	0.179	-
HCM Control Delay (s/veh)	71.5	31.6	-	-	10.4	-
HCM Lane LOS	F	D	-	-	B	-
HCM 95th %tile Q (veh)	3	5	-	-	0.7	-

Future (2045) with Mitigation

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	87	593	460	30	130	140
Future Volume (veh/h)	87	593	460	30	130	140
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	0.97		0.99	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	1810	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	102	698	541	35	153	165
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	1	1	1	1	1	1
Cap, veh/h	93	636	716	46	188	771
Arrive On Green	0.48	0.48	0.41	0.41	0.41	0.41
Sat Flow, veh/h	193	1320	1751	113	844	1885
Grp Volume(v), veh/h	801	0	0	576	153	165
Grp Sat Flow(s),veh/h/ln	1515	0	0	1864	844	1885
Q Serve(g_s), s	53.0	0.0	0.0	29.1	15.9	6.2
Cycle Q Clear(g_c), s	53.0	0.0	0.0	29.1	45.0	6.2
Prop In Lane	0.13	0.87		0.06	1.00	
Lane Grp Cap(c), veh/h	730	0	0	763	188	771
V/C Ratio(X)	1.10	0.00	0.00	0.76	0.82	0.21
Avail Cap(c_a), veh/h	730	0	0	763	188	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	0.0	0.0	27.8	48.6	21.0
Incr Delay (d2), s/veh	63.1	0.0	0.0	4.3	23.5	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	31.3	0.0	0.0	13.7	5.5	2.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	91.6	0.0	0.0	32.1	72.1	21.2
LnGrp LOS	F			C	E	C
Approach Vol, veh/h	801		576			318
Approach Delay, s/veh	91.6		32.1			45.7
Approach LOS	F		C			D

Timer - Assigned Phs		2				6	8
Phs Duration (G+Y+Rc), s		51.0				51.0	59.0
Change Period (Y+Rc), s		6.0				6.0	6.0
Max Green Setting (Gmax), s		45.0				45.0	53.0
Max Q Clear Time (g_c+I1), s		31.1				47.0	55.0
Green Ext Time (p_c), s		3.4				0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay, s/veh	62.8
HCM 6th LOS	E

MOVEMENT SUMMARY

Site: 24 [9: Black Lake Blvd & Black Lake Belmore Rd (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Black Lake Blvd & Black Lake Belmore Rd
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Black Lake Blvd															
8	T1	All MCs	189	1.0	189	1.0	0.251	4.2	LOS A	1.4	34.5	0.44	0.47	0.44	15.4
18	R2	All MCs	78	1.0	78	1.0	0.251	4.5	LOS A	1.4	34.5	0.44	0.47	0.44	27.3
Approach			267	1.0	267	1.0	0.251	4.3	LOS A	1.4	34.5	0.44	0.47	0.44	18.9
East: Black Lake Belmore Rd															
1	L2	All MCs	122	1.0	122	1.0	0.311	6.5	LOS A	1.8	45.3	0.42	0.45	0.42	26.8
16	R2	All MCs	222	1.0	222	1.0	0.311	2.3	LOS A	1.8	45.3	0.42	0.45	0.42	17.6
Approach			344	1.0	344	1.0	0.311	3.8	LOS A	1.8	45.3	0.42	0.45	0.42	21.2
North: Black Lake Blvd															
7	L2	All MCs	244	1.0	244	1.0	0.523	11.5	LOS B	4.0	99.7	0.43	0.55	0.43	28.5
4	T1	All MCs	367	1.0	367	1.0	0.523	5.8	LOS A	4.0	99.7	0.43	0.55	0.43	33.8
Approach			611	1.0	611	1.0	0.523	8.1	LOS A	4.0	99.7	0.43	0.55	0.43	31.5
All Vehicles			1222	1.0	1222	1.0	0.523	6.1	LOS A	4.0	99.7	0.43	0.50	0.43	25.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 24 [11: 7th Ave & Linwood Ave (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

7th Ave & Linwood Ave
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: 7th Ave															
3	L2	All MCs	1	2.0	1	2.0	0.004	2.2	LOS A	0.0	0.5	0.52	0.29	0.52	18.1
8	T1	All MCs	1	2.0	1	2.0	0.004	2.2	LOS A	0.0	0.5	0.52	0.29	0.52	18.1
18	R2	All MCs	1	2.0	1	2.0	0.004	2.2	LOS A	0.0	0.5	0.52	0.29	0.52	18.1
Approach			3	2.0	3	2.0	0.004	2.2	LOS A	0.0	0.5	0.52	0.29	0.52	18.1
East: Linwood Ave															
1	L2	All MCs	1	2.0	1	2.0	0.522	5.6	LOS A	4.3	109.7	0.20	0.17	0.20	18.6
6	T1	All MCs	333	2.0	333	2.0	0.522	0.6	LOS A	4.3	109.7	0.20	0.17	0.20	24.5
16	R2	All MCs	322	2.0	322	2.0	0.522	1.5	LOS A	4.3	109.7	0.20	0.17	0.20	24.4
Approach			657	2.0	657	2.0	0.522	1.0	LOS A	4.3	109.7	0.20	0.17	0.20	24.5
North: 7th Ave															
7	L2	All MCs	300	2.0	300	2.0	0.317	7.4	LOS A	1.7	43.8	0.52	0.61	0.52	22.9
4	T1	All MCs	1	2.0	1	2.0	0.317	5.8	LOS A	1.7	43.8	0.52	0.61	0.52	17.9
14	R2	All MCs	11	2.0	11	2.0	0.317	3.2	LOS A	1.7	43.8	0.52	0.61	0.52	23.0
Approach			312	2.0	312	2.0	0.317	7.3	LOS A	1.7	43.8	0.52	0.61	0.52	22.9
West: Linwood Ave															
5	L2	All MCs	22	2.0	22	2.0	0.192	7.0	LOS A	1.0	25.7	0.48	0.35	0.48	23.8
2	T1	All MCs	167	2.0	167	2.0	0.192	1.9	LOS A	1.0	25.7	0.48	0.35	0.48	24.0
12	R2	All MCs	1	2.0	1	2.0	0.192	4.1	LOS A	1.0	25.7	0.48	0.35	0.48	18.4
Approach			190	2.0	190	2.0	0.192	2.5	LOS A	1.0	25.7	0.48	0.35	0.48	23.9
All Vehicles			1162	2.0	1162	2.0	0.522	3.0	LOS A	4.3	109.7	0.33	0.31	0.33	23.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 24 [39: 93rd Ave & Tilley Rd SW (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

93rd Ave & Tilley Rd SW
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Tilley Rd SW															
3	L2	All MCs	215	2.0	215	2.0	0.359	14.1	LOS B	2.2	55.3	0.64	0.71	0.64	34.6
18	R2	All MCs	101	2.0	101	2.0	0.359	8.2	LOS A	2.2	55.3	0.64	0.71	0.64	35.1
Approach			316	2.0	316	2.0	0.359	12.2	LOS B	2.2	55.3	0.64	0.71	0.64	34.8
East: 93rd Ave															
1	L2	All MCs	132	2.0	132	2.0	0.527	11.2	LOS B	4.0	100.8	0.58	0.56	0.58	35.5
6	T1	All MCs	425	2.0	425	2.0	0.527	5.6	LOS A	4.0	100.8	0.58	0.56	0.58	34.2
Approach			557	2.0	557	2.0	0.527	6.9	LOS A	4.0	100.8	0.58	0.56	0.58	34.5
West: 93rd Ave															
2	T1	All MCs	443	2.0	443	2.0	0.578	5.1	LOS A	4.9	123.9	0.51	0.48	0.51	35.0
12	R2	All MCs	215	2.0	215	2.0	0.578	5.1	LOS A	4.9	123.9	0.51	0.48	0.51	36.9
Approach			658	2.0	658	2.0	0.578	5.1	LOS A	4.9	123.9	0.51	0.48	0.51	35.6
All Vehicles			1532	2.0	1532	2.0	0.578	7.2	LOS A	4.9	123.9	0.56	0.56	0.56	35.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 24 [40: Old Hwy 99 & 93rd Ave (Site Folder: Tumwater)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Old Hwy 99 & 93rd Ave
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: 93rd Ave															
3	L2	All MCs	72	1.0	72	1.0	0.559	18.0	LOS B	4.8	121.5	0.91	0.88	1.13	32.9
18	R2	All MCs	277	1.0	277	1.0	0.559	12.4	LOS B	4.8	121.5	0.91	0.88	1.13	33.3
Approach			349	1.0	349	1.0	0.559	13.6	LOS B	4.8	121.5	0.91	0.88	1.13	33.2
East: Old Hwy 99															
1	L2	All MCs	145	1.0	145	1.0	0.431	11.8	LOS B	3.3	84.4	0.34	0.52	0.34	36.4
6	T1	All MCs	373	1.0	373	1.0	0.431	6.2	LOS A	3.3	84.4	0.34	0.52	0.34	39.9
Approach			518	1.0	518	1.0	0.431	7.8	LOS A	3.3	84.4	0.34	0.52	0.34	38.9
West: Old Hwy 99															
2	T1	All MCs	771	1.0	771	1.0	0.725	7.4	LOS A	7.5	188.0	0.64	0.54	0.64	39.6
12	R2	All MCs	60	1.0	60	1.0	0.725	7.1	LOS A	7.5	188.0	0.64	0.54	0.64	36.5
Approach			831	1.0	831	1.0	0.725	7.3	LOS A	7.5	188.0	0.64	0.54	0.64	39.3
All Vehicles			1699	1.0	1699	1.0	0.725	8.7	LOS A	7.5	188.0	0.60	0.61	0.65	37.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Transportation Plan

Appendix C – Bicycling, Walking, & Rolling Plan

City of Tumwater 2025 Comprehensive Plan

Balancing Nature and Community: Tumwater's Path to Sustainable Growth

DRAFT VERSION NOVEMBER 24, 2025

December 2025

Ordinance No. O2025-010

CITY OF TUMWATER

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Abbreviations Used in Document

LTS – Level of Traffic Stress

1. Introduction

A. Vision

The purpose of the Tumwater Bicycling, Walking, & Rolling[1] Plan is to establish a strategy to improve city-wide bicycle and pedestrian facilities, making the community's active transportation network safe, accessible, and inviting for all users.

To achieve this, Tumwater will develop new or strengthen existing bicycling and walking connections to key destinations such as transit centers, activity centers, trails, schools, and employment sites. The strategy also prioritizes providing frequent, high quality crossing opportunities for active transportation users, especially along transit routes and in densely populated areas.

In Tumwater, historic development patterns and the rising popularity of cars changed the ways people connected to places and communities. Railroad connections and topography initially made it difficult to include downtown on major transportation lines without steep uphill climbs on the bluff east of Deschutes River Valley. These choices altered the economic conditions and slowed the growth of Tumwater's downtown.

The construction of Capitol Blvd in 1938 moved traffic away from the historic downtown. Then in the 1950s, the construction of Interstate 5 through the historic downtown bisected Tumwater and disconnected communities. The increasing convenience and popularity in motorized vehicle travel resulted in environmental concerns such as greenhouse gas emissions, air pollution, water runoff pollution, and noise pollution.

The Bicycling, Walking, & Rolling Plan prioritizes human-scale investments that connect people and communities, enhance the environment, and revitalize local economy. The projects and priorities in this plan are guided by community engagement, gap analysis, and the work of previous Tumwater plans.

B. Active Transportation

Active transportation includes any primarily human-powered mode of transportation such as walking, bicycling, using a mobility device like a wheelchair or scooter, roller skating, skateboarding, or using electric micromobility devices including e-bikes and e-scooters. It does not include motorcycles or larger and higher speed vehicles.

All trips start and end with active transportation, like walking, rolling, or bicycling to or from a private vehicle or a bus stop.

Active transportation contributes to a healthy, active community while reducing pollution and negative health impacts from driving. Active transportation is also an important part of a

[1] Rolling includes using mobility devices like wheelchairs or scooters, roller skating or skateboarding, and using electric micromobility devices.

successful transportation system, as it reduces roadway congestion.

The Interstate 5 and US 101 create major barriers to active transportation in Tumwater. Limited crossings, many without bike lanes and sidewalks, mean that people travelling without vehicles are at a distinct disadvantage. The terrain of Tumwater similarly presents obstacles as large elevation changes are difficult to traverse when using human powered modes.

C. Reasons for Investment

There are many reasons to prioritize investments in active transportation infrastructure. Improving the active transportation system increases the safety and accessibility for users, making it easier to use. Increasing the share of trips made by alternative transportation will help Tumwater improve community health, promote accessibility, and reach its per capita vehicle miles traveled reduction and mode shift goals.

1) Access

Travel choice is influenced by many factors including ability, socioeconomic status, and infrastructure. Active transportation investments promote accessibility by increasing transportation choices available to all members of the community regardless of ability or income. Developing a safe and complete active transportation network is essential in making this mode an accessible and inviting option to users.

People who do not or cannot drive may have no other choice but to use active transportation to get to school, work, and other key destinations. Based on a statewide study, it is likely that approximately 25 to 35 percent of Tumwater's residents are unable to Dr, either due to:

- Age (both young and old)
- The costs of purchasing, operating, and maintaining a car
- A disability or condition that prevents or limits driving
- Preference not to have a car
- Lack a driver's license[2]

In addition, people who tend to drive may be temporarily unable to drive due to car repairs or maintenance.

A lack of infrastructure allowing people to use active transportation safely and conveniently creates an access concern. A safe, and convenient active transportation network provides more travel choices to all residents, regardless of age or ability.

2) Community Health

Active transportation supports Tumwater's overall transportation system, promotes healthy lifestyles, improves air quality, and enhances economic conditions and community character.

Investment in active transportation infrastructure creates opportunities for people to build exercise into their daily routine. Active lifestyles reduce the risk of associated health conditions such as obesity, diabetes, and cardiovascular disease.

[2] https://leg.wa.gov/media/41gegl2v/nondriversstudyfinalreportsummaryreport.pdf.

Increasing the share of trips made by active transportation will help reduce vehicle trips and roadway congestion in Tumwater, reducing emissions and air pollution.

Air quality due to vehicle transportation is a significant area of focus for Tumwater. Pollution from vehicle transportation contributes to asthma and other respiratory illnesses and can make existing health conditions worse. People who live near heavy traffic roadways are exposed to higher levels of air pollution from diesel and gasoline exhaust.[3]

3) Vehicle Miles Traveled

Vehicle miles traveled is defined as the miles driven by cars on roads in Tumwater. Transportation is one of the largest contributors to greenhouse gas emissions in Tumwater, so reducing vehicle miles traveled is a key part of reaching Tumwater's greenhouse gas reduction goals.

Improving access for other modes of transportation can also reduce the need for expensive road capacity projects. Tumwater strives to achieve a 27 percent reduction in per capita vehicle miles traveled compared to 2022 base-year volumes by 2040 and a 41 percent reduction by 2050.

4) Mode Shift

Tumwater is committed to increasing the share of trips made by alternatives to driving alone and active transportation is an important part of achieving this goal. Tumwater has set goals of shifting 15 percent of single occupancy vehicle trips to walking, bicycling, and transit.

5) Transit

Many people who use active transportation also take transit as part of their trip to work, school, and other key destinations.

Intercity Transit operates four routes in Tumwater and is free and accessible to all users. Used in conjunction with active transportation, taking the bus connects people with a larger travel radius and more destinations. Intercity Transit buses are also equipped with bike racks, making transit a convenient option for people who bike to and from their bus stop.

Tumwater will continue to partner with Intercity Transit to ensure bus stops are accessible, safe, and convenient so people can easily transition from active transportation to taking the bus.

D. Partnering Agencies

Tumwater routinely coordinates with agencies and community groups on transportation.

For example, Tumwater works closely with Intercity Transit to ensure transit is accommodated on City roadways. Cross coordination also occurs between Tumwater and Thurston Regional Planning Council to implement the Regional Trails Plan and other regional transportation planning and projects.

[3] Health effects from diesel pollution - Washington State Department of Ecology

Tumwater will continue to seek opportunities to partner with neighboring jurisdictions to create more connectivity between boundaries. Tumwater will also explore partner with other agencies when applying for grants to make proposals more competitive.

Tumwater provided opportunities for key stakeholders to comment on this Bicycling, Walking, & Rolling Plan. The plan was reviewed and revised in coordination with the following community groups and government entities:

- Intercity Transit
- People First
- Puget Sound Asthma Coalition
- Thurston County
- Thurston County Developmental Disability Coalition
- Thurston Regional Planning Council
- Washington State Department of Transportation

2. Framework and Analysis

A. Existing Plans

Several plans provide active transportation infrastructure that meets community priorities. The plans below include Tumwater specific plans.

1) Tumwater Transportation Plan

The Tumwater Transportation Plan serves as a guide for improvement and expansion of the transportation system to meet demands through a horizon year of 2045 and includes the Bicycling, Walking, and Rolling Plan as Appendix B. There are a number of Subarea Plans that are incorporated into the Transportation Plan update and project list development.

2) Parks, Recreation and Open Space Plan

The Parks, Recreation and Open Space Plan (2016) includes projects that serve both recreational and transportation purposes, such as trails. Existing trails maintained by Tumwater include:

- Deschutes Valley Trail
- Historic Park / Tumwater Falls Trail – 0.6 miles of dirt, paved, and brick trail connecting to Capitol Lake Interpretive Park in the Deschutes Valley
- Palermo Watershed Trail – 0.7 miles of dirt path near Tumwater Valley Golf Course.
- Pioneer Park Trails – 2.1 miles of looping dirt and paved nature paths
- Tumwater Hill Trail – 0.5 miles of dirt nature path beginning at Ridgeview Court SW adjacent to Tumwater Hill Elementary School.
- Tyee Drive Trail – 0.2 miles of mixed use trail extending from BPA easement northward.

More information about the trail system is found in the Parks, Recreation and Open Space Plan.

3) Americans with Disabilities Act Transition Plan Update

The purpose of the Americans with Disabilities Act Transition Plan is to ensure that Tumwater continues to create reasonable accessible paths of travel in the public right-of-way for everyone, including people with disabilities.

Tumwater conducted a self-assessment in 2020, inventorying sidewalks and noting deficiencies. Updated in 2021, the plan discusses methods Tumwater uses to identify, evaluate, and remove barriers. Barrier removal is prioritized based upon public input, location, condition, and cost effectiveness. A schedule for correcting these deficiencies as funding is available is needed.

4) Brewery District Plan

The Brewery District is centered around the former Olympia Brewery. This district is one of the oldest parts of Tumwater.

The Brewery District Plan aims to guide redevelopment in the area to improve transportation safety and access. Originally adopted in 2014 and amended in 2020, the plan has four goals:

- Create a stronger sense of place by facilitating pedestrian access, establishing gathering places for residents, and fostering a distinct District identity.
- Improve transportation options, safety, and access within and across the District.
- Expand economic opportunity and activity.
- Improve the function and appearance of the built environment.

Improving alternative transportation is a priority both within the Brewery District and on the streets that connect the Brewery District to other parts of Tumwater. Connections to the district are part of the bicycle priority network shown in Figure BWR-11.

5) Capitol Blvd Corridor Plan

The Capitol Blvd Corridor is Tumwater's most traveled St, developed primarily in the 1950s and 1960s. It is located between the Southgate Shopping Center area and Israel Rd.

The Capital Blvd Corridor Plan was adopted in 2015 and has three main goals:

- Improve the business conditions.
- Improve safety and expand transportation options for all users of the corridor including pedestrians, bicycles, and vehicles.
- Improve the aesthetic appeal of the corridor as a whole.

This corridor is part of the bicycle priority network shown in Figure BWR-11.

6) Old Highway 99 Corridor Plan

Old Highway 99 Corridor Plan addresses the development and improvement of Old Highway 99 from 79th Ave to 93rd Ave.

The Plan incorporated land use, environmental, and transportation considerations as necessary to determine preferred alignment, cross sections, intersection control, stormwater strategies, mitigation strategies, right-of-way needs, implementation strategies, and future project estimates.

The Plan was adopted in 2024 and is used to prioritize projects, including projects that improve active transportation along the corridor.

7) Regional Plans

Connections throughout the region are essential to provide effective services for those traveling in Tumwater. Regional plans were considered during the development of the Plan. Details of some of the other agency plans are discussed below.

Thurston Regional Planning Council Regional Trails Plan

The goal of the Thurston Regional Trails Plan is to establish a comprehensive, well-connected non-motorized trail network that links all communities throughout the region. Eight government entities own and operate the region's major trails.

As of 2023, 14 major trail corridors in the region provide over 57 miles of trails. These trail corridors help connect people to the outdoors for recreation and provide a safe and convenient way to travel to key destinations and economic opportunities.

The Thurston Regional Trails Plan outlines the proposed trail projects that will expand the regional trail system, enhance the current system, and increase connections within the trail network.

In Thurston Regional Planning Council's 2021 "Connect. Explore. Move. How do you trail?" survey, 20 percent of respondents used trails for commuting to work, school, or errands.[4] Respondents selected the following trails to prioritize in the next 20 years:

- **Deschutes Valley Trail** – connecting Tumwater and Olympia along the Deschutes River
- **Gate Belmore Trail** – connecting Tumwater and Olympia with Rochester and the Chehalis Reservation
- **Karen Fraser Woodland Trail Extension** – connecting Olympia southwest to Tumwater

The completion of the 0.8-mile segment of the Deschutes Valley Trail between Historical Park and Brewery Park at Tumwater Falls was the most recent milestone in the regional trail network.

The following trail corridors, extensions, and system enhancements are included in the Regional Trails Plan:

- **Capitol Lake to Belmore Trail Corridor**
  - Black Lake Trail – conceptual (20+ years)
- **Deschutes Valley Trail Corridor**
  - Tumwater Valley Dr extension – planned (2026)
  - Pioneer Park extension – planned (20+ years)
- **Tumwater to Downtown Olympia Union Pacific Line Corridor**
  - East Olympia Trail – conceptual (20+ years)
  - Bonneville Power Administration Shared Use Path – conceptual (20+ years)
- **Karen Fraser Woodland Trail Corridor**
  - Olympia Phase 4 extension, Henderson to Tumwater – planned (20+ years)

B. Key Destinations & Origins

Understanding where people want to travel is a key component to developing a transportation system that works for users.

For active transportation it is important to consider people using the system to access daily needs and connections to transit since they may not have other transportation options. Access to public education is also critical since very few of the people accessing those services can drive alone and congestion near schools for pick up and drop off is an increasing concern.

Key destinations are shown in Figure BWR-1 and described in more detail below.

[4]https://www.trpc.org/DocumentCenter/View/12180/Regional-Trails-Plan-FINAL---December-2023.

1) Schools

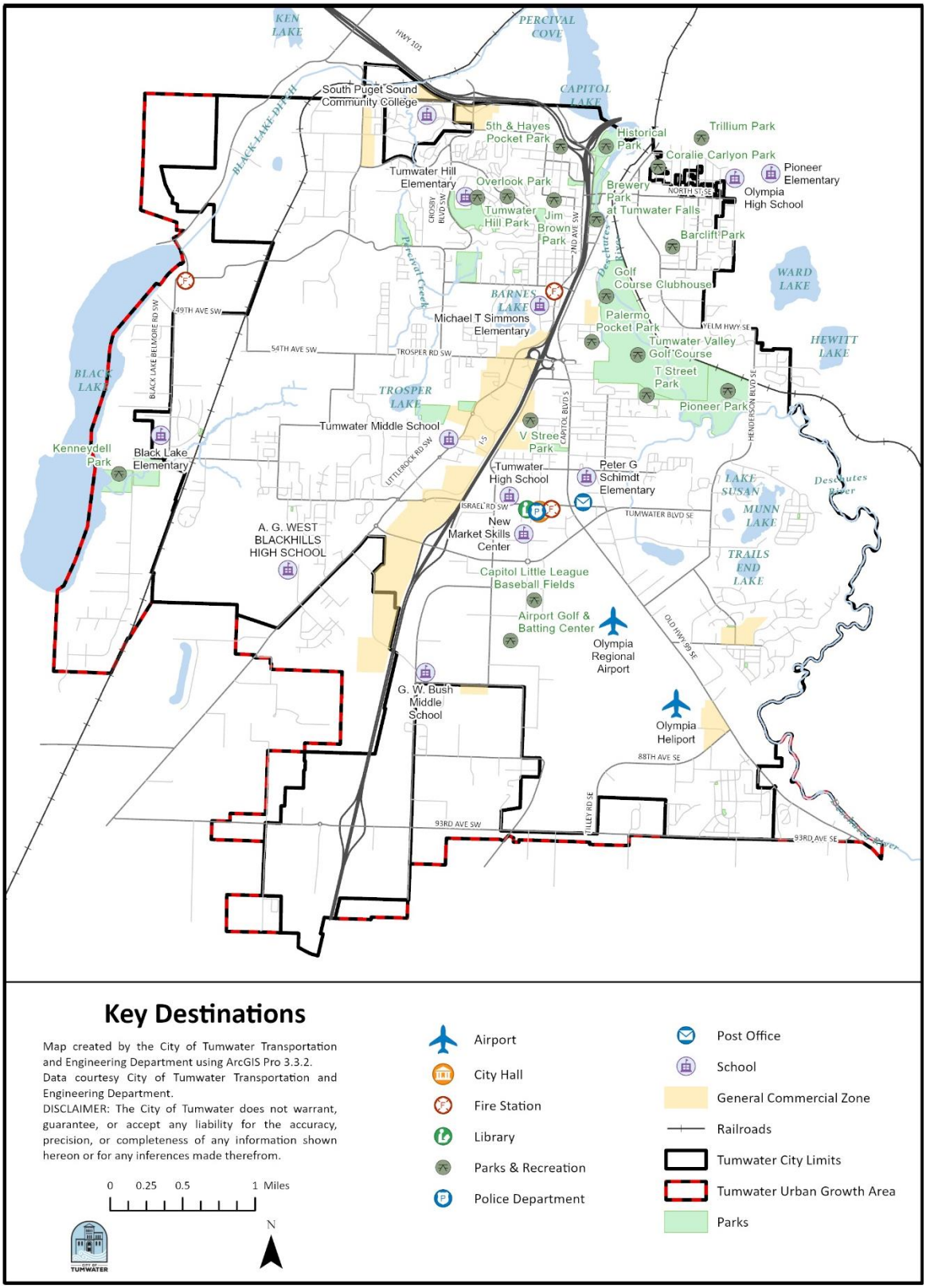
The Tumwater School District served 6,328 students as of 2025. The district includes ten K-12 schools within Tumwater's city limits.

- A.G. West Black Hills High School
- Black Lake Elementary School
- Cascadia High School
- George Bush Middle School
- Michael T. Simmons Elementary School
- New Market Skills Center
- Peter G. Schmidt Elementary School
- Tumwater High School
- Tumwater Hill Elementary School
- Tumwater Middle School

2) South Puget Sound Community College

Located in Olympia on Tumwater's northwest border, South Puget Sound Community College serves 6,000 students. The college is connected to Tumwater by designated bike routes as well as several Intercity Transit routes.

Figure BWR-1. Key Destinations in Tumwater.



Source: City of Tumwater Transportation and Engineering Department, 2025.

3) Libraries

The Tumwater Timberland Library offers resources available to anyone with a library card.

The library provides computer access, meeting rooms, study spaces, and events, as well as books and other media. The library is also one of two locations that act as a cooling and warming center during inclement weather.

4) Food Banks

There are seven locations that function as food banks and serve Tumwater residents during certain hours[5]:

- Littlerock United Methodist Church
- Lutheran Church of the Good Shepherd
- Mountain View Church
- Northstar Church of God
- South Puget Sound Community College
- Tumwater Senior Center
- Tumwater United Methodist Church

5) Parks & Recreation

Tumwater operates 12 parks and recreation facilities, including neighborhood parks, waterfront parks, sports facilities, and trails. Parks are large attractions for active transportation users.

- **5th and Hayes Pocket Park**. This small neighborhood park features a basketball court and a playground.
- **Barclift Park**. This park has the following amenities: basketball court, picnic areas, playground, restroom, tennis court, and trails.
- **Deschutes Valley Park**. This park features picnic areas, a playground, and restrooms.
- **Tumwater Historical Park.** At 17 acres, this is one of the largest parks in Tumwater. Amenities include barbeque grills, boat launch, picnic areas, a large playground, restroom, rentable shelter, and trails.
- **Isabella Bush Park**. This park contains trails and wetlands.
- **Jim Brown Park**. This neighborhood park features basketball courts, picnic areas, a playground, and tennis courts.
- **Overlook Point Park**. This park offers picnic areas and viewpoints.
- **Palermo Pocket Park**. This neighborhood park has basketball courts and a playground.
- **Pioneer Park**. One of the largest parks in Tumwater, Pioneer Park, has the following amenities: barbeque grills, baseball field, horseshoe pits, picnic areas, a playground, restrooms, rentable shelter, soccer fields, trails, and volleyball courts.
- **Tumwater Hill Park**. This park has a baseball field, picnic areas, restroom, and trails.
- **Tumwater Valley Municipal Park**. This golf course offers 20 holes of

[5] https://tcfb.org/services/locations/pick-up/.

championship-caliber golf and a ten-acre driving range.

- **V St Park**. This small neighborhood park has a basketball court and a playground.

6) ASHHO Cultural Community Center

The ASHHO Cultural Community Center is a private event center used for meetings, conferences, retreats, fundraising events, parties, and markets.

7) Olympia Regional Airport

Operated by the Port of Olympia, the Olympia Regional Airport and the associated New Market Industrial Center covers 845 acres and supports over 500 jobs. The general aviation airport has two runways and offers aircraft service and maintenance, flight instruction, and hangar space.

Commercial passenger airline service is anticipated by not currently available, but charter flight service is offered. Shuttle services are available to transport passengers to Seattle-Tacoma International Airport.

C. Level of Traffic Stress

Tumwater is adopting new multimodal Level of Service metrics as part of the Transportation Plan update. These metrics show where the transportation system has strengths and opportunities for improvement. While congestion and delay are used to measure vehicle level of service, different multimodal level of service metrics are used for active transportation.

Level of Traffic Stress (LTS) provides a quantifiable tool to gauge the comfort and safety of active transportation infrastructure. Level of traffic stress ranges from 1, where a wide range of users feel safe and comfortable, to 4, representing the highest Level of Traffic Stress where most users feel uncomfortable and will likely not choose to walk or bicycle.

Figure BWR-2 illustrates all four levels of traffic stress.

Figure BWR-2. Level of Traffic Stress Breakdown.

Source: Fehr & Peers, 2025.

It is important to note that while levels of traffic stress 3 and 4 feel uncomfortable to most users, some people have no choice but to use active transportation on these facilities. Tumwater is committed to achieving a Level of Traffic Stress of 1 or 2 on its roadways. Achieving this goal will improve comfort for people who already use active transportation and will make active transportation a more attractive option for people who have a choice of transportation modes.

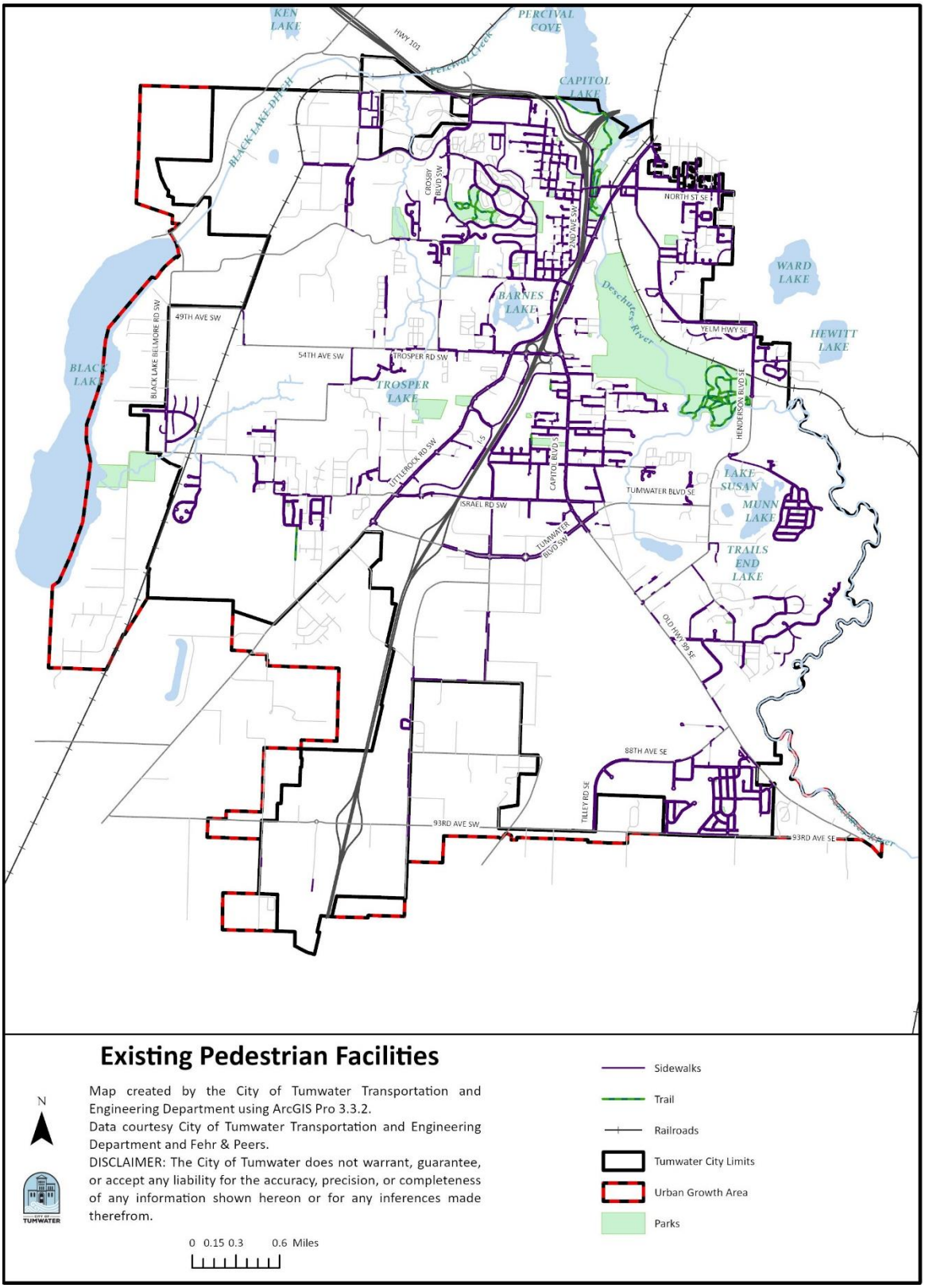
Given that levels of traffic stress for bicycling and walking are influenced by different factors, the breakdown for bike and pedestrian levels of traffic stress varies slightly.

D. Pedestrian Network Analysis: Gaps

Pedestrian facilities in Tumwater consist of sidewalks and shared-use trails. Sidewalks are available along many arterials, streets within the central business district, and in newer subdivisions. However, older residential areas often have incomplete or poorly maintained sidewalks. Tumwater has a total of 70 road miles with sidewalks of which roughly 33 miles are complete with pedestrian facilities on both sides of the St.

Figure BWR- 3 shows the existing pedestrian facilities in Tumwater.

Figure BWR-3. Existing Pedestrian Facilities.



Source: Fehr & Peers, 2025.

1) Pedestrian Level of Traffic Stress

Pedestrian Level of Traffic Stress is based on the roadway classification and presence of pedestrian facilities. Table BWR-1 illustrates the breakdown of pedestrian level of stress values while Figure BWR-4 shows how Level of Traffic Stress values apply to the pedestrian network throughout Tumwater.

Major arterials typically receive a score of 2 given the presence of sidewalks on both sides of the St. Where there are no pedestrian facilities, a score of 4 is assigned.

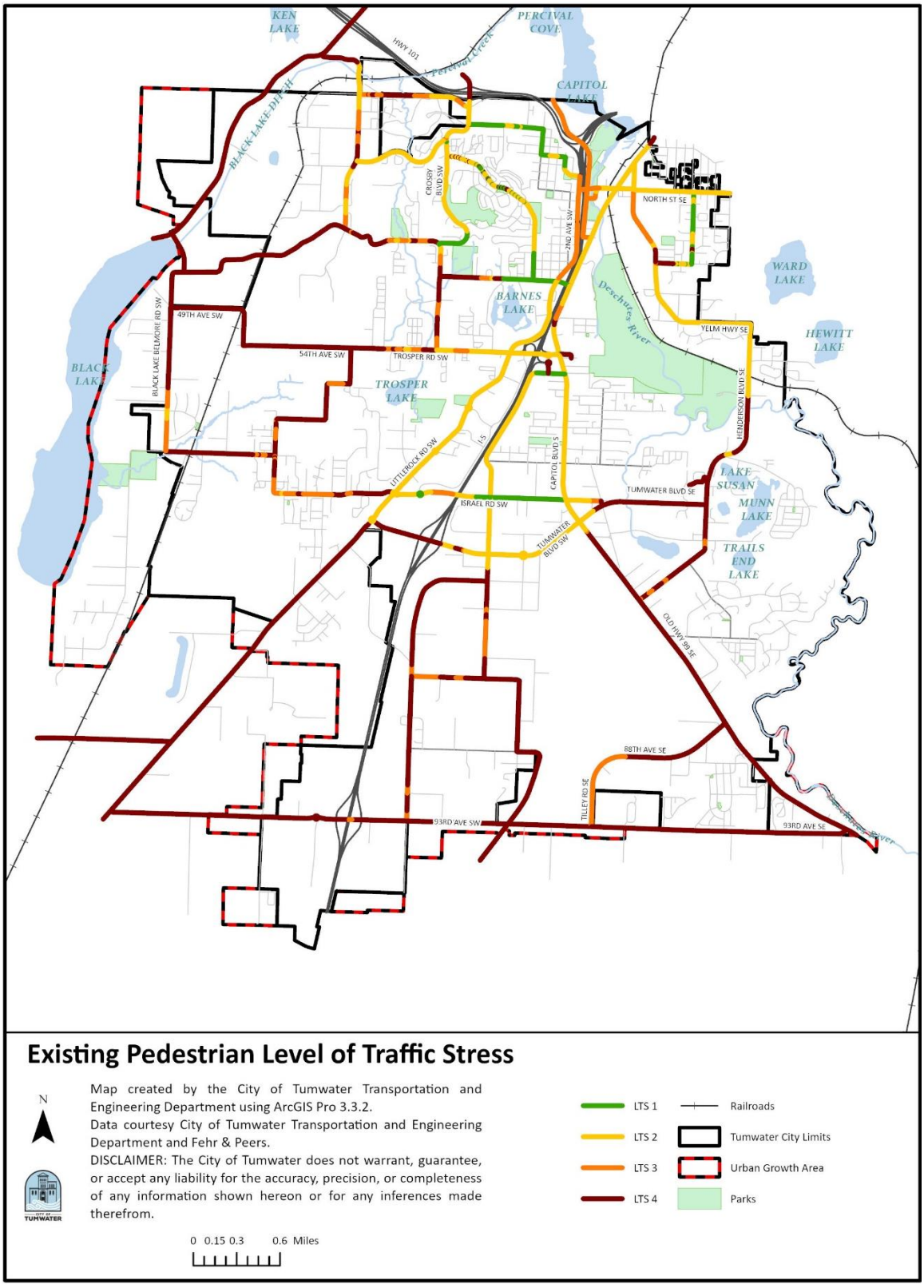
It is important to note that Pedestrian Level of Traffic Stress is limited to the variables shown in the table and does not consider sidewalk condition and necessary maintenance, presence of a landscaped buffer, or other important characteristics.

Table BWR-1. Pedestrian Level of Traffic Stress Classifications for Different Facilities.

Roadway Classification	No Pedestrian Facility	Sidewalk One Side	Sidewalk Both Sides	Separated Path/Trail
Local	4	2	1	1
Collector	4	2	2	1
Arterial	4	3	2	1

Source: Fehr & Peers, 2025.

Figure BWR-4. Existing Pedestrian Level of Traffic Stress.

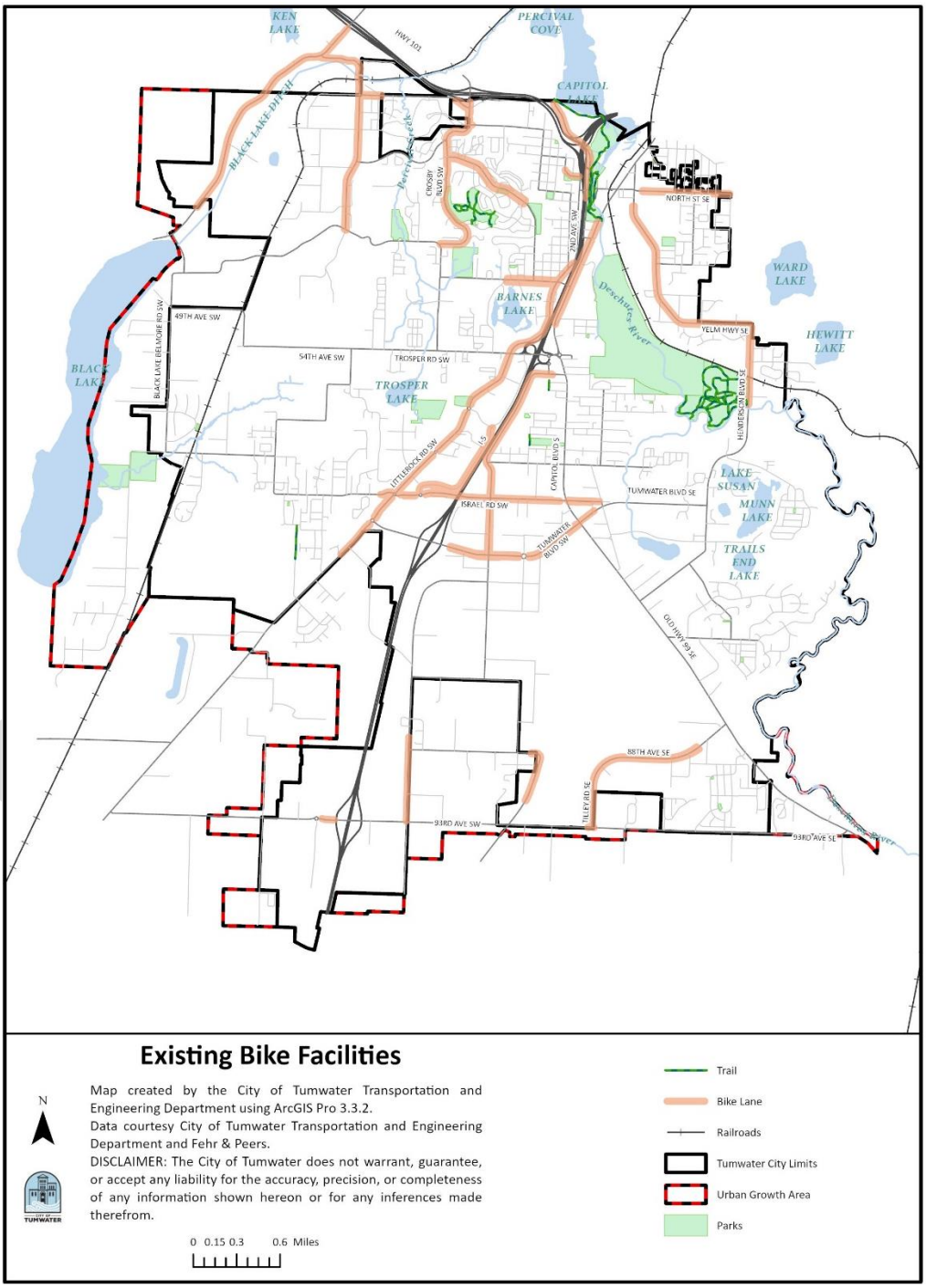


Source: Fehr & Peers, 2025.

E. Bicycle Network Analysis: Gaps & Level of Traffic Stress

The bicycle network within Tumwater primarily consists of bike lanes and shared-use trails as shown in Figure BWR-5. Of the 87 total miles in the bike network, about 27 miles (31 percent) are complete with bike facilities on both sides of the street.

Figure BWR-5. Existing Bicycle Facilities.



Source: Fehr & Peers, 2025.

2) Bicycle Level of Traffic Stress

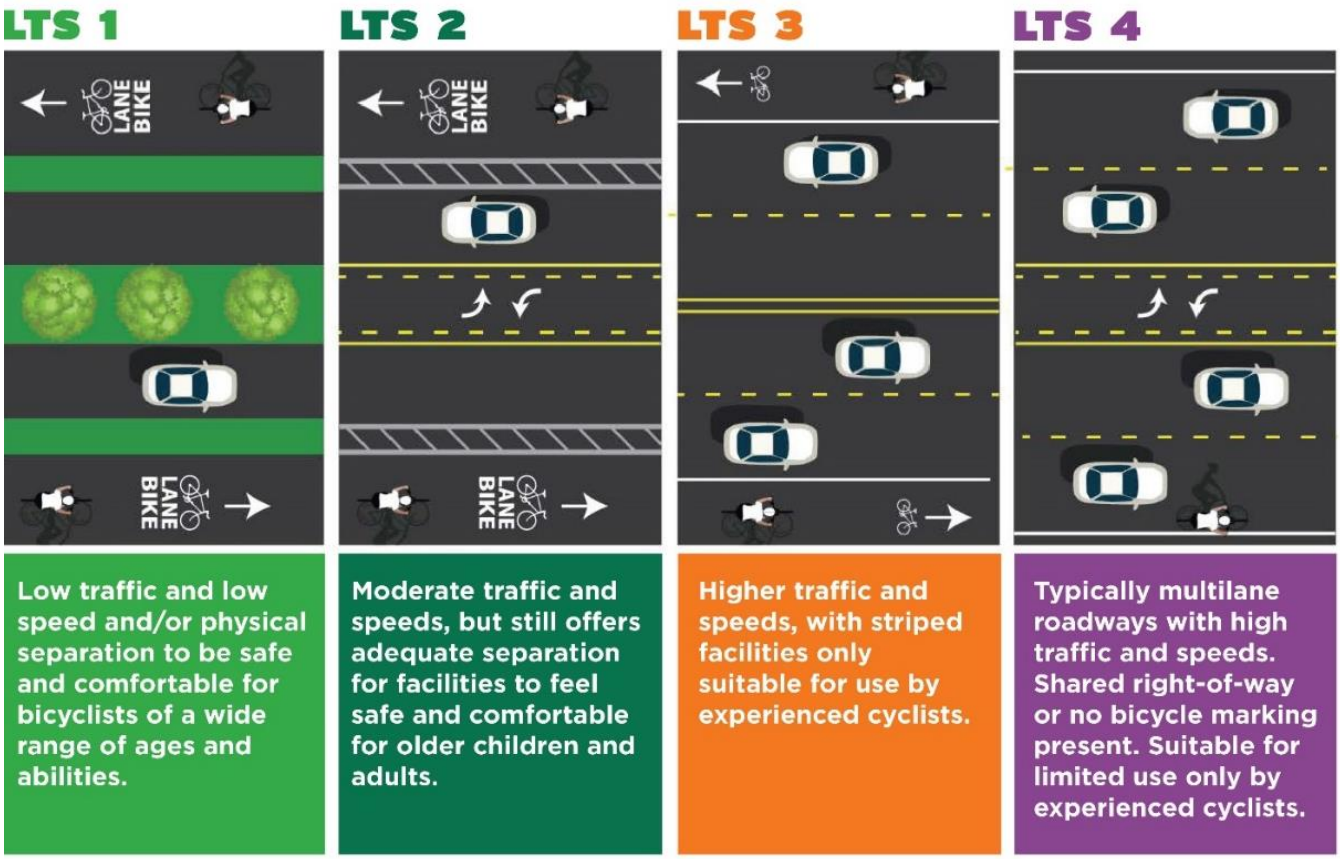
The way bicycle Level of Traffic Stress is determined is shown in Figure BWR-6**.** It incorporates factors such as posted speed limit, annual average daily vehicle traffic volume, and type of bicycle facility. Although features like buffered bike lanes and separated bike lanes are absent in Tumwater today, they are included for future reference.

Facilities like shared-use paths consistently receive a score of 1, as they are entirely separated from the roadway and are not affected by vehicular traffic. Striped bike lanes, which are common in Tumwater, score from 1 to 4 depending on the roadway speed limit and traffic volume.

Table BWR-2 and Figure BWR-7 shows the Level of Traffic Stress for bicycle facilities in Tumwater. This is further explained in Table BWR-3 which shows examples of bike facilities, and the Level of Traffic Stress score they receive.

The analysis shows the gaps within both the bicycle and pedestrian networks. However, it is crucial to acknowledge that both pedestrian and bicycle Level of Traffic Stress assessments lack considerations for factors such as maintenance, actual driver speeds as opposed to posted speed limits, roadway crossings, and facility width, which are crucial in ensuring optimal user experiences. Thus, any formulation of future bike and pedestrian projects in Tumwater should use the maps as a reference and holistically address these additional considerations.

Figure BWR-6. Bicycle Level of Traffic Stress Definitions.



Source: WSDOT, Fehr & Peers, 2025.

Table BWR-2. Bicycle Level of Traffic Stress.

Roadway Characteristics		Bicycle Facility Component					
Speed Limit (MPH)	Annual Average Daily Traffic	No Bicycle Facility	Wide Shoulder	Striped Bicycle Lane	Buffered Bicycle Lane (Horizontal)	Separated Bicycle Lane (Vertical)	Shared Use Path
25	<1,500	3	1	1	1	1	1
	1,500 – 7,000	3	2	2	2	1	1
	>7,000	4	2	2	2	1	1
30	<7,000	4	3	2	2	1	1
	7,000 – 15,000	4	3	3	2	1	1
	>15,000	4	4	3	3	2	1
35	<15,000	4	4	3	3	3	1
	>15,000	4	4	4	3	3	1
>35	Any	4	4	4	4	3	1

Source: Fehr & Peers, 2025.

Table BWR-3. Bicycle Facility Types.

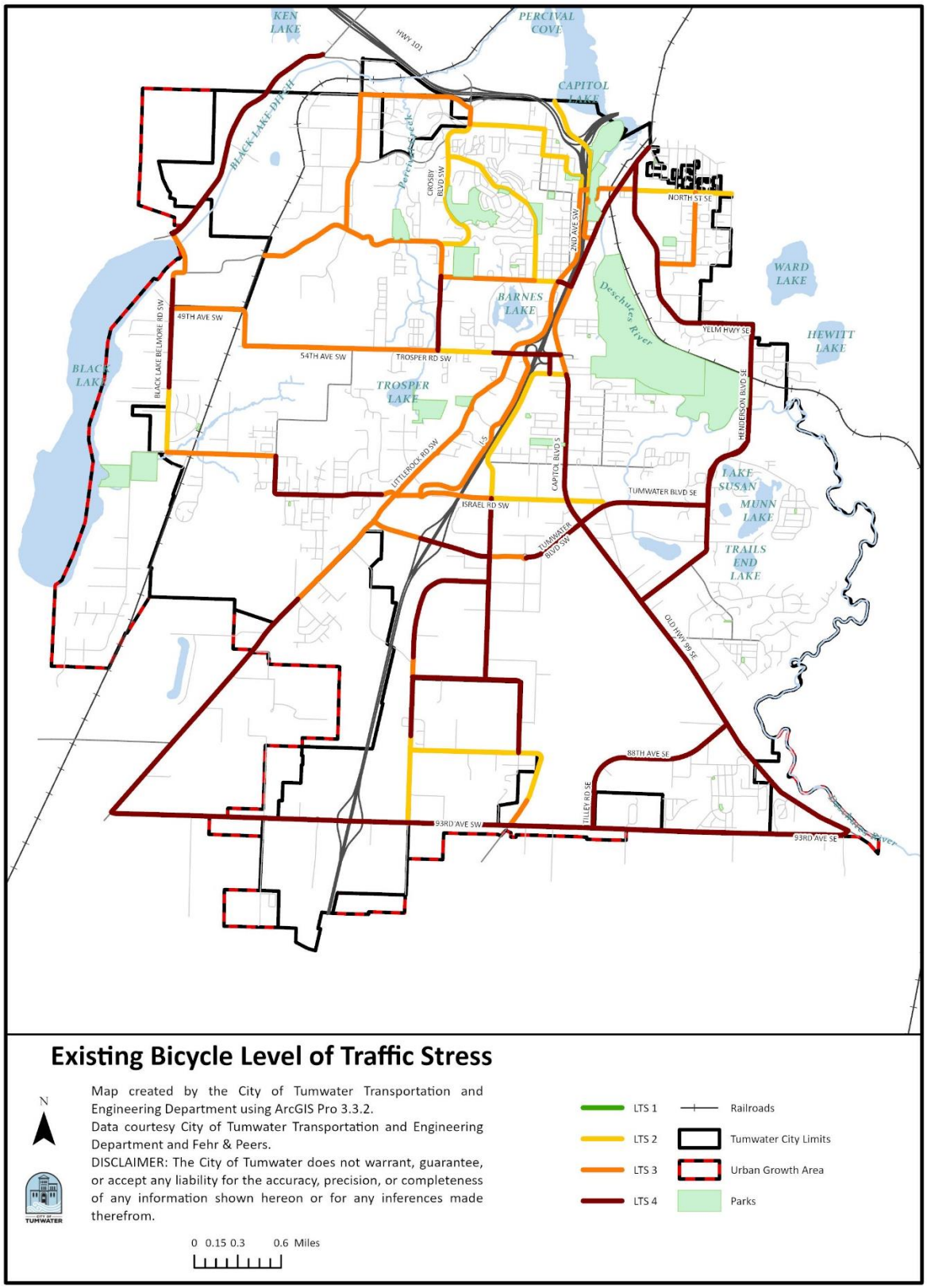
Facility Type	Description	Example
Off-Corridor Bike Network	Bike boulevards are low-volume and low-speed streets that prioritize bike travel. They incorporate signage, pavement markings, and traffic calming tools to improve the comfort and connectivity of the bike roadway network. Bike boulevards offer an alternative to bicycling on busy streets with high traffic volumes. Many bike boulevards couple speed management strategies with bike route signage to create safer streets.	
Striped Bike Lane	A conventional bike lane is a striped lane on a roadway that is designated for exclusive use by people riding bikes. Conventional bike lanes include pavement markings indicating one-way bike use. These facilities are established along roadways where there is current or anticipated bike demand and where it would be unsafe for bicyclists to ride in the travel lane.	

Facility Type	Description	Example
Buffered Bike Lane (Horizontal)	Buffered bike lanes are conventional bike lanes paired with a designated buffer space separating the bike lane from the adjacent motor vehicle travel lane and/or parking lane. These facilities are established along roadways with high travel speeds, volumes, and/or truck traffic.	
Separated Bike Lane (Vertical)	Separated bike lanes (vertical) are buffered bike lanes with vertical elements that provide further separation from motor vehicle traffic. Common vertical elements are vertical curbs, a painted buffer with planter boxes, parked cars, or a fixed barrier. These facilities keep motorists from crossing into the bike lane and to minimize maintenance costs due to decreased motor vehicle wear. They may be especially appropriate for curvy streets, areas with high drop off/pick up activity, and higher speed streets with few driveways and cross streets.	 Source: NACTO, 2019.[6]
Physically Separated Bikeway / Shared Use Paths	Physically separated bikeways are paths distinct from the sidewalks. These include shared use paths, which are paved trails for the exclusive use of pedestrians, cyclists, skaters, and other active transportation users. They are wide enough for two-way travel. They are typically separated from motorized vehicular traffic by an open space, barrier, curb, or exist in an independent corridor. They can also be one-way bike facilities separate from – but adjacent to – the sidewalk.	

Note: All images are courtesy of Fehr & Peers unless otherwise noted.
Source: Fehr & Peers, 2025.

[6] https://nacto.org/2019/11/15/bellevues-downtown-demonstration-bikeway/

Figure BWR-7. Existing Bicycle Level of Traffic Stress.



Source: Fehr & Peers, 2025.

3. The Future Network

A. Active Transportation in the Community

The goal of the future active transportation network in Tumwater is to provide safe, accessible and convenient active transportation routes so that all users of the transportation system have opportunities to travel to work, school, healthcare facilities, stores, and other key destinations.

Tumwater has an established network of pedestrian and bicycle infrastructure, but significant gaps exist. Many streets lack pedestrian or bicycle facilities. Many roadways with bike lanes have high traffic volumes and high speeds.

Level of Traffic Stress 3 and 4 bicycle facilities likely deter users who could choose to use active transportation instead of driving a motorized vehicle. For those that have no other option, navigating Level of Traffic Stress 3 or 4 adds stress for the user and subjects them to uncomfortable conditions.

Tumwater's vision of expanding its active transportation network will help improve the connectivity of the existing active transportation network, increase the number of facilities with a Level of Traffic Stress of 1 or 2, and meet vehicle miles traveled targets. Active transportation could be an alternative to driving on congested roadways for many people, but the existing infrastructure between major areas of interest suffers from a disconnected network and low levels of comfort.

the comfort and convenience of active transportation facilities improve, people are more likely to choose to use active transportation rather than drive, thus reducing vehicle miles traveled. Active transportation infrastructure improvements will also help those who already use active transportation in Tumwater to feel more comfortable while traveling. More information about safety can be found in Chapter 2 of the Transportation Plan.

Locations with a significant focus for improved active transportation access include schools, libraries, state resource offices, and senior centers as these locations service a high proportion of people who do not drive. As Schools serve a high concentration of people who do not drive, making these priority locations for safety improvements.

The road networks surrounding schools can become congested before and after the school day, raising safety concerns due to the simultaneous use of various modes of transportation within a compressed timeframe. Schools that do not have accessible active transportation routes generally experience more intense vehicle traffic in the peak periods, leading to congestion on nearby roadways.

Air quality around schools is a growing concern, particularly due to vehicle idling during drop-off and pick-up times. This issue is closely linked to the prevalence and severity of childhood asthma, affecting students' health and academic performance. Tumwater will prioritize active transportation improvements near schools, so students and school employees have accessible and convenient options to use active transportation.

B. Public Outreach

Outreach was completed in coordination with the overall Comprehensive Plan update, and included asking the community about their transportation priorities, locations of concern, and their day-to-day modal choices. The March 2025 outreach event also included map-based activities where community members could identify locations where they use active transportation and identify areas of concern.

Attendees denoted popular bicycling areas like Custer Way SW, Capitol Blvd SE, Henderson Blvd SE, Kirsop Rd SW, 66th Ave SW, Black Lake Belmore Rd SW, Sapp Rd SW, and various local streets. Challenges for cyclists include inconsistent bike lanes, overgrown vegetation encroaching on bike paths, and dangerous intersections such as Henderson Blvd SE at Deschutes Bridge, where multiple bicycle collisions have occurred. Residents also expressed the need for wide bike lanes and improvements near the library.

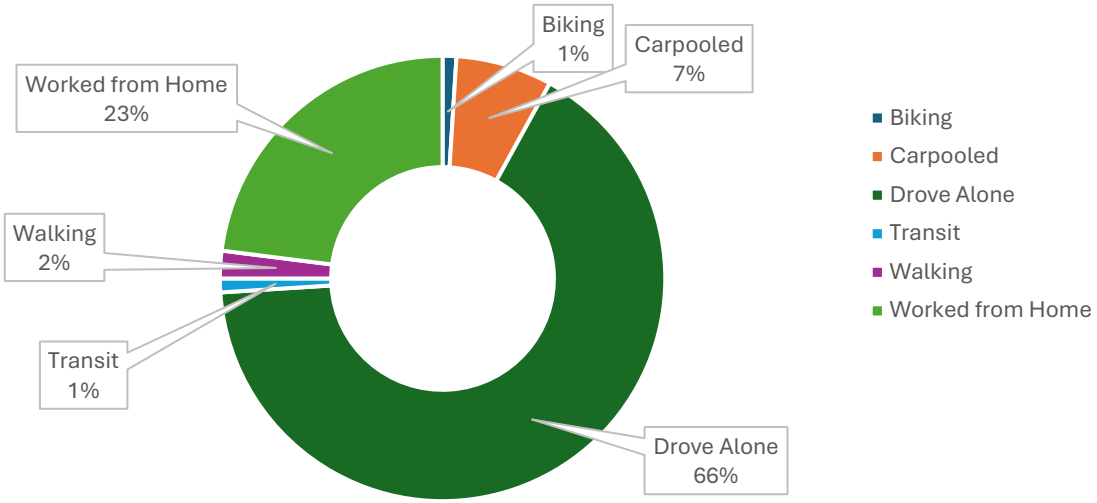
Attendees also marked common walking routes, including Cleveland Ave SE, 66th Ave SW, 70th Ave SW, Littlerock Rd SW, Israel Rd SW, Lindwood Ave SW, Kirsop Rd SW, and numerous local roads. Pedestrian concerns focus on the lack of continuous sidewalks, insufficient crosswalks, and overgrown vegetation obstructing pathways, particularly near the roundabout by the church on Mottman Blvd SW. There was also a call for more neighborhood connections, raised crosswalks, and pedestrian-level amenities like waste bins, streetlights, and benches.

C. Mode Shift

To achieve the Transportation Plan's safety, accessibility, and vehicle miles traveled reduction targets, some trips will need to shift from single occupancy vehicle trips to more efficient modes. These modes include carpooling, transit, and active transportation modes.

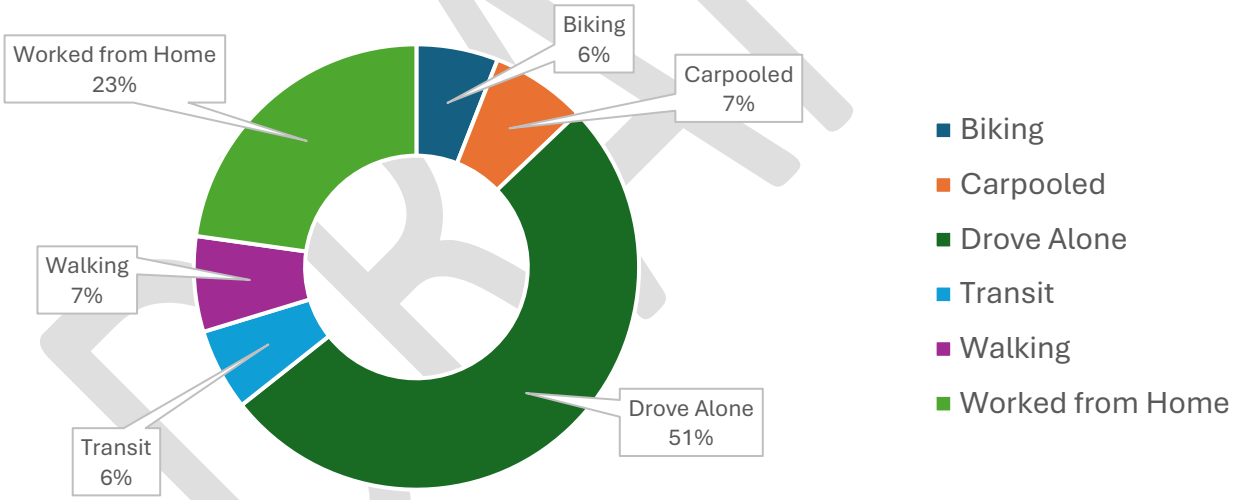
Current data in Figure BWR-8 shows that most trips in Tumwater are taken by car, with many being single occupancy vehicles. Tumwater is setting a goal to shift five percent of single occupancy vehicle trips to walking, five percent to bicycling, and five percent to transit as shown in Figure BWR-9.

Figure BWR-8. Share of Primary Travel Options for Commuting to Work.



Source: American Community Survey, 2023.

Figure BWR-9. Tumwater's 2045 Mode Shift Goals.



Effecting mode shift is difficult, but can be done through a combination of strategies:

- Creating more walkable and bikeable communities by building a connected low stress network.
- Reducing or eliminating parking minimums.
- Charging for parking in higher density areas with transit and active mode networks.
- Increasing job and residential density.
- Integrating affordable and below market rate housing.
- Providing ridesharing program.

- Providing end of trip bicycle facilities.
- Providing employer-sponsored van pool.
- Using paid workplace parking.
- Implementing housing and employment parking cash-out.
- Providing electric vehicle charging infrastructure.
- Implementing conventional carshare program.
- Implementing transit-supportive roadway improvements.

Multimodal infrastructure is necessary to support mode shift and travel outside of a personal vehicle. Individual bike and pedestrian projects do not substantially reduce vehicles miles traveled or lead to mode shifts on their own, but greater benefits are seen once a complete network is constructed.

The projects listed in Table BWR-4 combined with the current active transportation network contribute to a more complete multimodal network. These improvements will help Tumwater reach its mode shift targets.

D. Priority Networks & Near-Term Investments

Public input, gap analysis, previous plans and analysis, and key destinations were all considered in determining priority projects. Tumwater's priority networks identify areas of need to complete the layered multimodal network.

Multimodal priority networks promote the diverse needs of all users – pedestrians, cyclists, transit riders, and freight. By employing a layered network strategy, modal emphasis is assigned to different streets, ensuring that each mode of transportation is accommodated effectively. This method acknowledges that while all traveler types need to be accommodated within a community, no single road can serve all modes equally.

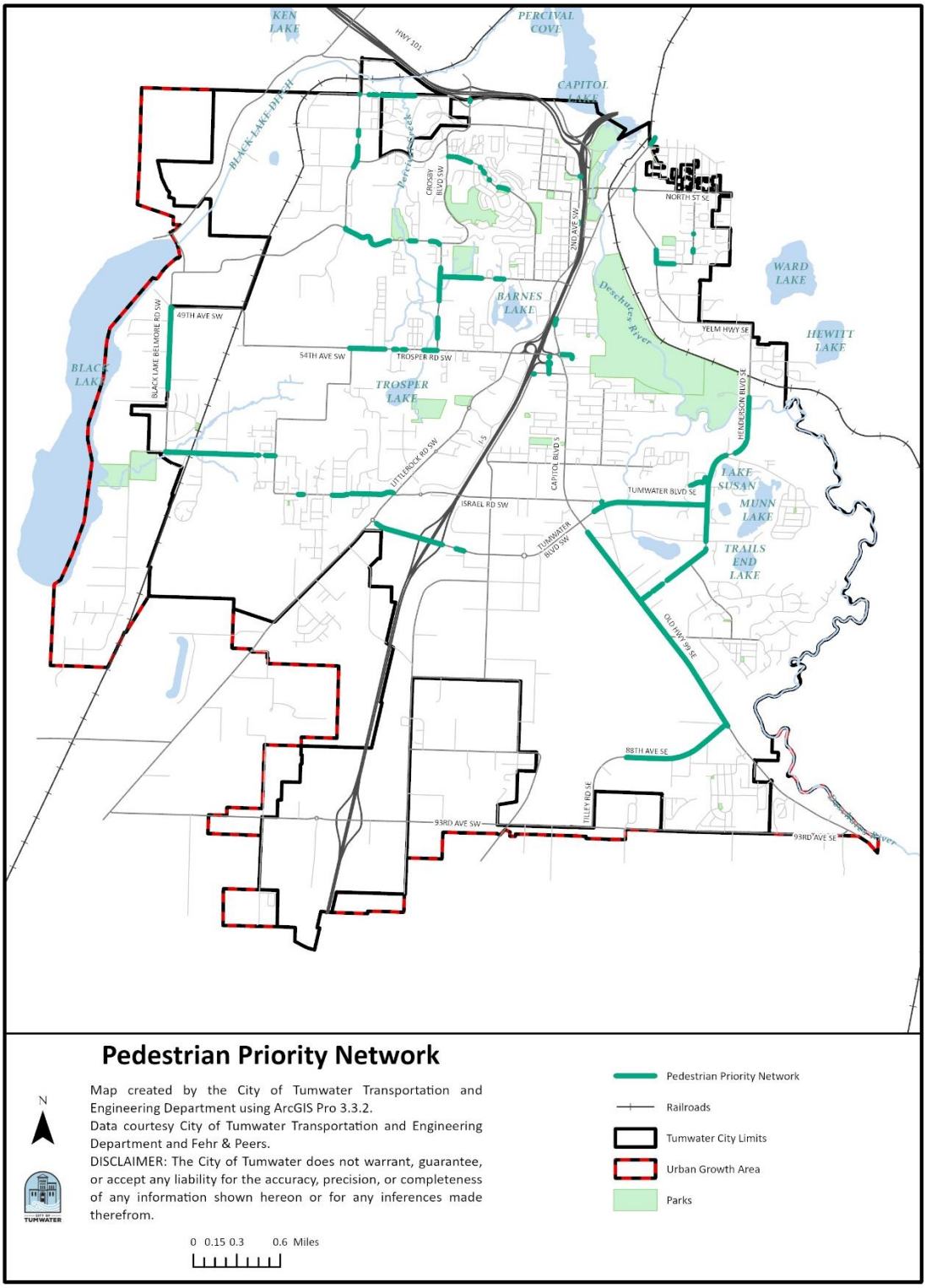
The priority network was developed using the following factors:

1. **Pedestrian and bicycle levels of traffic stress.** This data was analyzed for existing conditions to understand deficiencies. Streets with a Level of Traffic Stress of 3 or 4 will be further refined using locations with prominent network gaps and projected land use growth.
2. **Land use growth projected for 2045**. This data analyzed population, housing, and employment forecasts to determine opportunities to increase modal share.
3. **Network gaps and potential connectivity improvements.** This data demonstrates areas that prevent continuous travel to key locations such as those pointed out at public outreach events to improve connections between modes.

Building bicycle and pedestrian priority networks will provide Tumwater with a more accessible transportation system for all users. The priority networks concentrate investments in the densest areas and help fill in missing gaps

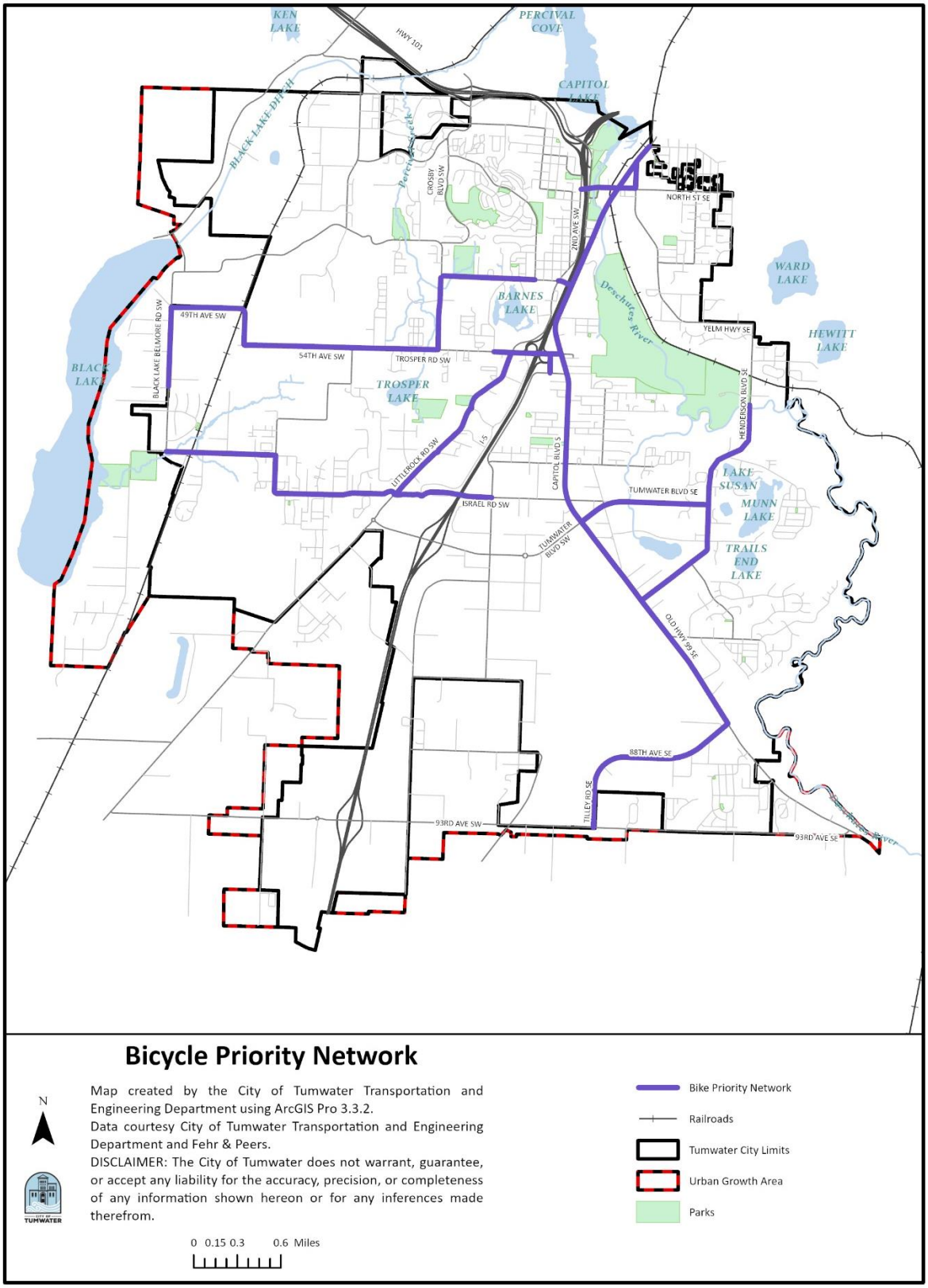
so that more people can safely travel outside of vehicles. The pedestrian priority network is shown in Figure BWR-10. The bicycle priority network is shown in Figure BWR-11.

Figure BWR-10. Pedestrian Priority Network.



Source: Fehr & Peers, 2025.

Figure BWR-11. Bicycle Priority Network.



Source: Fehr & Peers, 2025.

E. Active Transportation Projects

The list of long-term projects in Table BWR-4 was compiled from existing Tumwater plans and an analysis of gaps in the bike and pedestrian priority networks. Many of the projects listed below will achieve Tumwater's goal of Level of Traffic Stress 1 or 2 facilities. Some projects will only achieve a Level of Traffic Stress of 3 or 4.

These projects will need to be further refined before design work is completed to determine what type of facility can achieve the Level of Traffic Stress standard.

Table BWR-4. 20-Year Active Transportation Project List.

Project ID	Project Title	Project Description	Mode	Cost	Level of Traffic Stress
BWR-1	Mottman Rd SW Sidewalk and Bike Lane Improvements	Install sidewalk on the north side of Mottman Rd SW from the vicinity of Crosby Blvd SW to R.W. Johnson Blvd SW. Note that sidewalks and bike lanes will be added to both sides of Mottman Rd SW between Mottman Ct SW and R.W. Johnson Blvd SW during a pavement resurfacing project	Bike / Pedestrian	$1,900,000	Bike: 3 Ped: 2
BWR-2	76th Ave SW/ Kimmie St Bike Facilities	From 83rd Ave SW to 93rd Ave SW	Bike	$500,000	Bike: 3
BWR-3	83rd Ave Bike SW Facilities	From Kimmie St SW to Center St SW	Bike	$700,000	Bike: 4
BWR-4	Bonniewood Dr SE Bike Facilities	From Dennis St SE to Old Highway 99 SE	Bike	$1,200,000	Bike: 2
BWR-5	Black Lake-Belmore Rd SW Bike Lanes	From 66th Ave SW to Black Lake Blvd SW (some partial programmatic potential)	Bike	$4,000,000	Bike: 3
BWR-6	Linwood Ave SW Bike Facilities	From Sapp Rd SW to G St SW	Bike	$2,400,000	Bike: 3
BWR-7	88th Ave SW Bike Facilities	From just west of Cabot Dr SE to 85th Ave SE	Bike	$400,000	Bike: 4

Project ID	Project Title	Project Description	Mode	Cost	Level of Traffic Stress
BWR-8	Trosper Rd SW Bike Facilities	From Lake Park Dr SW to Rural Rd SW	Bike	$50,000	Bike: 2
BWR-9	Center St SW Bike Facilities	From Tumwater Blvd SW to 83rd Ave SW	Bike	$50,000	Bike: 3
BWR-10	Lake Park Dr SW Bike Facilities	From Linwood Ave SW to Trosper Rd SW	Bike	$200,000	Bike: 2
BWR-11	Vista Lp SW Bike Facilities	From Crosby Blvd SW to Barnes Blvd SW	Bike	$200,000	Bike: 2
BWR-12	12th Ave SW / Vista Lp SW Bike Facilities	From Barnes Rd SW to Irving St SW	Bike	$500,000	Bike: 2
BWR-13	Somerset Hill Rd SW Bike Facilities	From R.W. Johnson Blvd SW to Crosby Blvd SW. Consider widening existing 8' path to 12' in lieu of on-street bike facilities	Bike	$800,000	Bike: 1
BWR-14	Lee St / SW Boston Ave SW / Hazelhurst SW Bike Facilities	From Capitol Blvd SE to Elm St SE	Bike	$30,000	Bike: 2
BWR-15	7th Ave SW / Bates St SW / 3rd Ave SW Bike Facilities	From 2nd Ave SW to Crosby Blvd SW	Bike	$150,000	Bike: 2
BWR-16	Desoto St SW / 4th Ave SW / Ferry St SW Bike Facilities	From 7th Ave SW to 2nd Ave SW	Bike	$100,000	Bike: 2
BWR-17	X St SW Shared Bike Streets	Upgrade as necessary and sign with 'sharrows' X St SW, from Elm St SW to 7th Ave SW. (Programmatic potential)	Bike	$30,000	Bike: 3

Project ID	Project Title	Project Description	Mode	Cost	Level of Traffic Stress
BWR-18	New Pedestrian Connection from Linderson Way SW to Elm St SW, in vicinity of T St SW	Pedestrian facilities offering a direct route between Linderson Way SW and Elm St SW with a crossing at Capitol Way. Preferred route roughly aligns with T St SW and Pinehurst Dr SW	Pedestrian	$500,000	Ped: 1
BWR-19	Elm St SW Sidewalks	Completion of sidewalk facilities on Elm St SW between Pinehurst Dr SW and W St SW	Pedestrian	$160,000	Ped: 1
BWR-20	North-South Pedestrian Connection between X St SW and Dennis St SW	Create a new pedestrian / non-motorized connection through the future shared-use pathway on the BPA alignment to connect X St SW and Dennis St SW in the vicinity of Tumwater High School	Pedestrian	$300,000	Ped: 1
BWR-21	Trosper Rd SW -- Lake Park Dr SW to Rural Rd SW	Repurpose asphalt to provide 3 travel lanes and bike lanes	Motorized Vehicle / Bike	$225,000	Bike: 2
BWR-22	Old Highway 99 SE -- 73rd Ave SE to 88th Ave SE	Widen to 4 lanes with median, bike lanes and intersection improvements at Bonniewood Dr SE, Henderson Blvd SE, and 88th Ave SE	Motorized Vehicle / Bike	$22,000,000	Bike: 4
BWR-23	Capitol Blvd SE – Custer Way SE to Carlyon Ave SE	Reduce to 4 lanes, install bike lanes	Motorized Vehicle / Bike	$100,000	Bike: 3
BWR-24	Capitol Blvd SE – M St SW to Israel Rd SW	Reduce to 4 lanes, construct roundabouts at select intersections, install bike lanes, and construct median	Motorized Vehicle / Bike	$30,000,000	Bike: 3

Project ID	Project Title	Project Description	Mode	Cost	Level of Traffic Stress
BWR-25	2nd Ave SW Pedestrian and Bike Improvements	Identify gaps and add facilities to achieve Level of Traffic Stress 2	Bike / Pedestrian	$3,855,000	Bike: 2 Ped: 2
BWR-26	Rural Rd SW Shoulder Improvements	Widen shoulder and provide sidewalks to connect Sapp Rd SW to Trosper Rd SW.	Bike / Pedestrian	$500,000	Bike: 4 Ped: 4
BWR-27	66th Ave SW / 70th Ave SW Bike Lanes	From Black Lake-Belmore Rd SW to Littlerock Rd SW	Bike	$3,400,000	Bike: 3
BWR-28	70th Ave SW Pedestrian Improvements	Infill pedestrian sidewalk gaps to improve Level of Traffic Stress and provide critical connections	Pedestrian	3,000,000	Ped: 2
BWR-29	66th Ave SW Sidewalk Improvements	Infill pedestrian sidewalk gaps to improve Level of Traffic Stress and provide critical connections	Pedestrian	5,000,000	Ped: 2
BWR-30	88th Ave SW Sidewalk Improvements	Infill pedestrian sidewalk gaps to improve Level of Traffic Stress and provide critical connections	Pedestrian	2,100,000	Ped: 2
BWR-31	Tumwater Blvd SW Sidewalk Extension	Infill pedestrian sidewalk gaps to improve Level of Traffic Stress and provide critical east west connection	Pedestrian	2,000,000	Ped: 2
BWR-32	Rural Rd SW Sidewalk Development	Infill pedestrian sidewalk gaps to improve Level of Traffic Stress and provide critical connections	Pedestrian	2,500,000	Ped: 2
BWR-33	Linwood Ave SW Sidewalk Infill	Infill pedestrian sidewalk gaps to improve Level of Traffic Stress and provide critical connections	Pedestrian	200,000	Ped: 2

Project ID	Project Title	Project Description	Mode	Cost	Level of Traffic Stress
BWR-34	Tumwater Blvd SW Bike Lane Development	This project will convert wide lanes on Tumwater Blvd SW to bike lanes to improve the associated Level of Traffic Stress of the facility	Bike	16,800,000	Bike: 3
BWR-35	Deschutes Valley Trail	Phased Construction - Deschutes Valley Trail, from Pioneer Park (vicinity of Henderson Boulevard) to Tumwater Historical Park (Deschutes Parkway)	Pedestrian / Bike	$12,000,000	Ped:1, Bike:1
B	Safe Routes to School Projects	Improve pedestrian and bicyclist safety near schools. Projects include sidewalks, lighting, flashing beacons, signage, markings, and other measures. Project details developed as a part of the six-year Transportation Improvement Plan process.	Programmatic	$2,000,000	-

F. Funding Opportunities

There are many sources to help Tumwater pay for active transportation improvements, and these programs can and do change over time.

The funding opportunities below are a selection of external funding sources that may be a good match for Tumwater's active transportation improvements.

1) Transportation Improvement Board

The Transportation Improvement Board facilitates state investment in local transportation projects and distributes grant funding to cities and counties generated from the statewide gas tax. The Transportation Improvement Board offers several grant programs including the Active Transportation Program, which provides funding to improve pedestrian and cyclist safety, enhance

pedestrian and cyclist mobility connectivity, or improve the condition of existing facilities.[7]

2) Pedestrian & Bicycle Program

The Washington State Department of Transportation Pedestrian and Bicycle program awards funding for projects that enhance safety and mobility for people who walk or bike. The goal of the program is to eliminate fatal and serious injury pedestrian and bicyclist crashes, build connected low stress walk and bike networks, and increase walking and bicycling.

Two types of projects are eligible for this funding: construction projects and design-only projects. Design-only projects allow agencies the opportunity to engage with the community to develop projects that appeal to a wide range of users. The Active Transportation Programs Design Guide provides details for treatments intended to provide safer conditions for users of the active transportation network.

3) Safe Routes to School

The goal of the Safe Routes to School program is to improve the safety and mobility of children by enabling and encouraging them to use active transportation to school. This program provides funding for infrastructure projects within two miles of a school serving children in kindergarten through 12th grade. Construction, design-only, and education projects are all eligible for funding under this program.

4) Sandy Williams Connecting Communities Program

This program was established to improve active transportation connectivity in overburdened communities[8] along state and legacy highways. The program name honors Sandy Williams, a community activist who worked to reconnect her African American neighborhood after the construction of Interstate 90 divided the Spokane.

The focus of this program is on communities most affected by barriers to opportunity and environmental health disparities. This grant can be used to fund projects that enhance safety, comfort, and connectivity, making it easier for community members to access essential services and community spaces. Funding from this program can be used for planning, design, or construction, and can be used as a match for a federal grant award.

5) Transportation Alternatives Program

Transportation Alternatives projects encompass smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trail projects, and safe routes to school.

6) Active Transportation Infrastructure Investment Program.

This program is a competitive federal grant program for projects proving safe and connected active transportation facilities in active transportation networks or spines. The program

[7] https://www.tib.wa.gov/grants/grants.cfm

[8] https://experience.arcgis.com/experience/03cb82fc4a524e8c9723192e72c80a0e

awards both planning and design and construction grants.

Projects seeking planning and design grants must have costs of at least $100,000, and projects seeking construction grants must have total costs of at least $15 million to be eligible.[9] The goal of this grant is to integrate active transportation infrastructure with transit service to improve access and connectivity.

7) Surface Transportation Block Grant

Bicycle, pedestrian, and trail projects are eligible for funding under this flexible grant program. The Washington State Department of Transportation allocates Surface Transportation Block Grant funds to Metropolitan Planning Organizations and County Lead Agencies to select projects that align with regional priorities.[10]

G. Programmatic Improvements

While constructing active transportation infrastructure upgrades is an effective way to improve Tumwater's active transportation network, construction is costly and time intensive. Tumwater will explore other options to improve active transportation access and convenience. Some of these non-capital alternatives are explored below.

1) E-Bike Rebate Program

Many cities in the region have adopted e-bike rebate programs to help residents offset the cost of an e-bike. Tumwater can choose to open the program to all residents or restrict applicants to meet income qualifications. E-bikes present a faster, more comfortable and convenient alternative to standard bicycles, making bicycling a more appealing choice for some users of the transportation system.

2) Bike Share & Micromobility

Bike share programs involve renting bicycles from designated docking stations while e-scooter and dockless e-bike rentals are examples of shared micromobility options. These programs offer residents the option to bike and roll without the cost of purchasing, maintaining, and storing a bike or scooter. Bike shares and micromobility presents a convenient and affordable alternative to driving.

3) Bike Storage & Parking

Investing in bike racks, shelters, and lockers help make bicycling a more attractive and convenient option for cyclists. Offering bike storage and parking at key destinations like transit hubs, schools, and activity centers is an important aspect of bicycle infrastructure.

Guidelines could be created for bike parking, especially at key destinations and commercial areas. Bike storage with outlets would be especially beneficial to e-bike users who need to charge their bike before continuing their trip. Tumwater can also encourage employers and

[9] https://www.fhwa.dot.gov/environment/bicycle_pedestrian/atiip/.

[10] https://wsdot.wa.gov/business-wsdot/support-local-programs/funding-programs/surface-transportation-block-grant.

apartment buildings to offer secure bicycle parking for their employees.

4) Education

Education plays a crucial role in promoting safe and effective active transportation in cities. Educating users about road safety, traffic laws, and route selection can encourage participation.

Tumwater could establish a wayfinding plan for people who use active transportation and ensure proper distribution. Engagement with schools, community organizations, and businesses helps increase awareness, answer questions, and foster a culture that values active transportation as a transportation mode.

Tumwater can also take advantage of state and national initiatives like Bike Month or Walk, Bike, and Roll to School Day as educational opportunities.

5) Employer Partnerships

Tumwater could partner with employers to incentivize active transportation to work and encourage office buildings to provide showers and secure bicycle parking. Workplaces can also establish parking maximums, pricing strategies, and other policies that disincentivize driving alone to work or take an active role in the Commute Trip Reduction program, which affects worksites with at least 100 full-time employees who begin their shift between 6:00 – 9:00 am on weekdays.

6) Maintenance & Enforcement

Once bicycle and pedestrian facilities are built, Tumwater must ensure that they function as designed. There are several strategies Tumwater can employ to do this. Increase enforcement of parking restrictions in bike lanes. Properly maintain bike and pedestrian facilities by regularly cleaning up trash and debris, trimming vegetation, and removing obstacles. Tumwater can also develop speeding enforcement strategies on key bike connections.