

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Shafers School House Rd & SR 611

3/11/2015

									
Movement	SET	SER	NWL	NWT	NEL	NER			
Lane Configurations									
Volume (vph)	807	47	30	536	36	34			
Movement Number	2	12	1	6	3	18			
Initial Queue, veh	0	0	0	0	0	0			
Ped-Bike Adj. Factor (A_pbT)		1.00	1.00		1.00	1.00			
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00			
Adj. Sat. Flow Rate, veh/h/ln	1773	1773	1785	1819	1808	1827			
Lanes	1	0	1	1	1	1			
<b>Lane Assignment</b>									
Capacity, veh/h	1303	73	375	1425	137	124			
Proportion Arriving On Green	0.78	0.78	0.58	0.56	0.08	0.08			
Movement Delay, s/veh	0.0	6.7	17.1	8.4	40.0	40.2			
Movement LOS		A	B	A	D	D			
Approach Volume, veh/h	958			648	97				
Approach Delay, s/veh	6.7			8.9	40.1				
Approach LOS	A			A	D				
<b>Timer:</b>		1	2	3	4	5	6	7	8
Assigned Phase			2				6		8
Case No			8.0				6.0		9.0
Phase Duration (G+Y+Rc), s			74.80				74.80		12.98
Change Period (Y+Rc), s			6.00				6.00		6.00
Max. Allowable Headway (MAH), s			6.69				6.69		4.50
Maximum Green Setting (Gmax), s			68.80				68.80		7.70
Max. Queue Clearance Time (g_c+I1), s			24.76				28.63		4.50
Green Extension Time (g_e), s			29.15				27.38		0.08
Probability of Phase Call (p_c)			1.000				1.000		0.907
Probability of Max Out (p_x)			0.560				0.594		1.000
<b>Left-Turn Movement Data</b>									
Assigned Movement							1		3
Mvmt. Sat Flow, veh/h							559.28		1721.68
<b>Through Movement Data</b>									
Assigned Movement			2					6	
Mvmt. Sat Flow, veh/h			1663.02					1818.57	
<b>Right-Turn Movement Data</b>									
Assigned Movement			12				16		18
Mvmt. Sat Flow, veh/h			93.70				0.00		1552.84
<b>Left Lane Group Data</b>									
Assigned Movement		0	0	0	0	0	1	0	3
Lane Assignment							L		L
Lanes in Group		0	0	0	0	0	1	0	1
Group Volume (v), veh/h		0.0	0.0	0.0	0.0	0.0	38.5	0.0	50.7
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	0.0	0.0	559.3	0.0	1721.7
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	0.0	3.9	0.0	2.5
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	0.0	0.0	26.6	0.0	2.5

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Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	559.3	0.0	1721.7
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	68.8	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	46.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	3.9	0.0	0.0
Time to First Blk (g_f), s	0.0	68.8	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	375.4	0.0	136.9
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.102	0.000	0.370
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	375.4	0.0	151.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.950	0.000	1.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	16.8	0.0	38.3
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.7
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	17.1	0.0	40.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	0.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.1
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.06
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment	T							
Lanes in Group	0	0	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	609.1	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	1818.6	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	1425.3	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.427	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	1425.3	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.950	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	7.9	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	6.5	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00

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Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Right Lane Group Data**

Assigned Movement	0	12	0	0	0	16	0	18
Lane Assignment	T+R			R				
Lanes in Group	0	1	0	0	0	0	0	1
Group Volume (v), veh/h	0.0	957.8	0.0	0.0	0.0	0.0	0.0	46.6
Group Sat. Flow (s), veh/h/ln	0.0	1756.7	0.0	0.0	0.0	0.0	0.0	1552.8
Queue Serve Time (g_s), s	0.0	22.8	0.0	0.0	0.0	0.0	0.0	2.5
Cycle Queue Clear Time (g_c), s	0.0	22.8	0.0	0.0	0.0	0.0	0.0	2.5
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.053	0.000	0.000	0.000	0.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	1376.9	0.0	0.0	0.0	0.0	0.0	123.5
Volume-to-Capacity Ratio (X)	0.000	0.696	0.000	0.000	0.000	0.000	0.000	0.377
Available Capacity (c_a), veh/h	0.0	1376.9	0.0	0.0	0.0	0.0	0.0	136.2
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	4.5	0.0	0.0	0.0	0.0	0.0	38.3
Incremental Delay (d2), s/veh	0.0	2.2	0.0	0.0	0.0	0.0	0.0	1.9
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	6.7	0.0	0.0	0.0	0.0	0.0	40.2
First-Term Queue (Q1), veh/ln	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.9
Second-Term Queue (Q2), veh/ln	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.1
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	4.4	0.0	0.0	0.0	0.0	0.0	1.0
Percentile Storage Ratio (RQ%)	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.16
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Intersection Summary**

HCM Average Control Delay	9.5
HCM Level of Service	A

# HCM 2010 Signalized Intersection Capacity Analysis

## 2: Applegate Rd/Terrace Dr & SR 611

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	713	25	14	399	6	16	1	21	16	3	19
Movement Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1783	1835	1835	1890	1786	1786	1881	1956	1956	1891	1891	1891
Lanes	1	1	0	1	1	0	1	1	0	0	1	0
Lane Assignment												
Capacity, veh/h	675	1318	65	287	1319	35	123	15	122	80	24	56
Proportion Arriving On Green	0.42	0.23	0.23	0.76	0.76	0.76	0.08	0.08	0.08	0.08	0.08	0.08
Movement Delay, s/veh	11.6	0.0	24.5	21.4	0.0	4.0	42.7	0.0	39.4	41.2	0.0	0.0
Movement LOS	B		C	C		A	D		D	D		
Approach Volume, veh/h		914			492			54			71	
Approach Delay, s/veh		24.1			4.8			40.4			41.2	
Approach LOS		C			A			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2		4		6		8			
Case No			6.0		8.0		6.0		6.0			
Phase Duration (G+Y+Rc), s			74.00		14.69		74.00		14.69			
Change Period (Y+Rc), s			6.50		7.50		6.50		7.50			
Max. Allowable Headway (MAH), s			7.19		4.60		7.19		4.60			
Maximum Green Setting (Gmax), s			67.50		7.40		67.50		7.40			
Max. Queue Clearance Time (g_c+l1), s			40.85		6.42		42.95		7.53			
Green Extension Time (g_e), s			19.29		0.04		18.11		0.00			
Probability of Phase Call (p_c)			1.000		0.955		1.000		0.955			
Probability of Max Out (p_x)			0.696		1.000		0.724		1.000			
<b>Left-Turn Movement Data</b>												
Assigned Movement			5		7		1		3			
Mvmt. Sat Flow, veh/h			879.90		465.51		637.13		1336.60			
<b>Through Movement Data</b>												
Assigned Movement			2		4		6		8			
Mvmt. Sat Flow, veh/h			1731.25		144.71		1732.73		181.07			
<b>Right-Turn Movement Data</b>												
Assigned Movement			12		14		16		18			
Mvmt. Sat Flow, veh/h			86.00		696.52		45.34		1508.90			
<b>Left Lane Group Data</b>												
Assigned Movement		0	5	0	7	0	1	0	3			
Lane Assignment			L		L+T+R		L		L			
Lanes in Group		0	1	0	1	0	1	0	1			
Group Volume (v), veh/h		0.0	34.0	0.0	71.3	0.0	21.5	0.0	17.0			
Group Sat. Flow (s), veh/h/ln		0.0	879.9	0.0	1306.7	0.0	637.1	0.0	1336.6			
Queue Serve Time (g_s), s		0.0	2.2	0.0	2.6	0.0	2.1	0.0	1.1			
Cycle Queue Clear Time (g_c), s		0.0	9.8	0.0	4.4	0.0	40.9	0.0	5.5			

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Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	879.9	0.0	781.5	0.0	637.1	0.0	1336.6
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	67.5	0.0	7.2	0.0	67.5	0.0	7.2
Perm LT Serve Time (g_u), s	0.0	59.9	0.0	5.3	0.0	28.7	0.0	2.8
Perm LT Que Serve Time (g_ps), s	0.0	2.2	0.0	2.6	0.0	2.1	0.0	1.1
Time to First Blk (g_f), s	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	1.000	0.000	0.356	0.000	1.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	675.3	0.0	160.9	0.0	287.0	0.0	122.8
Volume-to-Capacity Ratio (X)	0.000	0.050	0.000	0.443	0.000	0.075	0.000	0.139
Available Capacity (c_a), veh/h	0.0	675.3	0.0	163.8	0.0	287.0	0.0	126.1
Upstream Filter Factor (I)	0.000	0.684	0.000	1.000	0.000	1.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	11.5	0.0	39.3	0.0	21.0	0.0	42.2
Incremental Delay (d2), s/veh	0.0	0.1	0.0	1.9	0.0	0.4	0.0	0.5
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	11.6	0.0	41.2	0.0	21.4	0.0	42.7
First-Term Queue (Q1), veh/ln	0.0	0.4	0.0	1.5	0.0	0.3	0.0	0.4
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.4	0.0	1.6	0.0	0.3	0.0	0.4
Percentile Storage Ratio (RQ%)	0.00	0.15	0.00	0.09	0.00	0.11	0.00	0.13
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Group	0	0	0	0	0	0	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

# HCM 2010 Signalized Intersection Capacity Analysis

## 2: Applegate Rd/Terrace Dr & SR 611

3/11/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Right Lane Group Data</b>								
Assigned Movement	0	12	0	14	0	16	0	18
Lane Assignment	T+R			T+R			T+R	
Lanes in Group	0	1	0	0	0	1	0	1
Group Volume (v), veh/h	0.0	880.5	0.0	0.0	0.0	470.6	0.0	37.3
Group Sat. Flow (s), veh/h/ln	0.0	1817.2	0.0	0.0	0.0	1778.1	0.0	1690.0
Queue Serve Time (g_s), s	0.0	38.9	0.0	0.0	0.0	7.6	0.0	1.8
Cycle Queue Clear Time (g_c), s	0.0	38.9	0.0	0.0	0.0	7.6	0.0	1.8
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.047	0.000	0.533	0.000	0.025	0.000	0.893
Lane Group Capacity (c), veh/h	0.0	1383.2	0.0	0.0	0.0	1353.3	0.0	136.9
Volume-to-Capacity Ratio (X)	0.000	0.637	0.000	0.000	0.000	0.348	0.000	0.273
Available Capacity (c_a), veh/h	0.0	1383.2	0.0	0.0	0.0	1353.3	0.0	141.0
Upstream Filter Factor (I)	0.000	0.684	0.000	0.000	0.000	1.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	23.2	0.0	0.0	0.0	3.4	0.0	38.3
Incremental Delay (d2), s/veh	0.0	1.3	0.0	0.0	0.0	0.6	0.0	1.1
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	24.5	0.0	0.0	0.0	4.0	0.0	39.4
First-Term Queue (Q1), veh/ln	0.0	18.5	0.0	0.0	0.0	1.5	0.0	0.8
Second-Term Queue (Q2), veh/ln	0.0	0.5	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	19.0	0.0	0.0	0.0	1.7	0.0	0.8
Percentile Storage Ratio (RQ%)	0.00	0.33	0.00	0.00	0.00	0.05	0.00	0.04
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Intersection Summary</b>								
HCM Average Control Delay	19.2							
HCM Level of Service	B							

HCM 2010 Signalized Intersection Capacity Analysis  
 3: SR 611 & Pocono Commons Dr

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶↷	↶	↶	↷	↶↷	↷
Volume (vph)	185	524	391	151	75	143
Movement Number	5	2	6	16	7	14
Initial Queue, veh	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00			1.00	1.00	1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1854	1768	1800	1947	1919	1901
Lanes	2	1	1	1	2	1
Lane Assignment						
Capacity, veh/h	373	1379	1075	988	275	301
Proportion Arriving On Green	0.11	0.78	0.60	0.60	0.08	0.08
Movement Delay, s/veh	38.4	3.7	10.1	8.4	38.7	33.2
Movement LOS	D	A	B	A	D	C
Approach Volume, veh/h		788	638		262	
Approach Delay, s/veh		13.1	9.6		35.3	
Approach LOS		B	A		D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phase		2		4	5	6		
Case No		4.0		9.0	2.0	7.0		
Phase Duration (G+Y+Rc), s		74.91		12.80	16.05	58.86		
Change Period (Y+Rc), s		6.50		6.00	6.50	6.50		
Max. Allowable Headway (MAH), s		6.66		3.62	3.19	6.66		
Maximum Green Setting (Gmax), s		69.10		6.80	9.60	51.70		
Max. Queue Clearance Time (g_c+I1), s		11.32		8.80	7.17	13.41		
Green Extension Time (g_e), s		18.85		0.00	0.12	16.89		
Probability of Phase Call (p_c)		1.000		0.998	0.994	1.000		
Probability of Max Out (p_x)		0.122		1.000	1.000	0.272		

Left-Turn Movement Data								
Assigned Movement					7	5		
Mvmt. Sat Flow, veh/h					3545.58	3425.27		

Through Movement Data								
Assigned Movement		2				6		
Mvmt. Sat Flow, veh/h		1768.06				1800.48		

Right-Turn Movement Data								
Assigned Movement			12		14		16	
Mvmt. Sat Flow, veh/h			0.00		1615.62		1654.66	

Left Lane Group Data								
Assigned Movement		0	0	0	7	5	0	0
Lane Assignment					L	L (Prot)		
Lanes in Group		0	0	0	2	2	0	0
Group Volume (v), veh/h		0.0	0.0	0.0	101.4	212.6	0.0	0.0
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	1772.8	1712.6	0.0	0.0
Queue Serve Time (g_s), s		0.0	0.0	0.0	2.4	5.2	0.0	0.0
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	2.4	5.2	0.0	0.0

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Pocono Commons Dr

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Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	1772.8	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	52.4	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	274.9	372.8	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.369	0.570	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	274.9	374.9	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	38.4	37.1	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.3	1.3	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	38.7	38.4	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	1.0	2.1	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	1.0	2.1	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.06	0.31	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment	T			T				
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	575.8	0.0	0.0	0.0	439.3	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1768.1	0.0	0.0	0.0	1800.5	0.0	0.0
Queue Serve Time (g_s), s	0.0	9.3	0.0	0.0	0.0	11.4	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	9.3	0.0	0.0	0.0	11.4	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1379.0	0.0	0.0	0.0	1074.9	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.418	0.000	0.000	0.000	0.409	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1393.0	0.0	0.0	0.0	1074.9	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	3.1	0.0	0.0	0.0	9.4	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.6	0.0	0.0	0.0	0.7	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	3.7	0.0	0.0	0.0	10.1	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	1.5	0.0	0.0	0.0	3.6	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	1.7	0.0	0.0	0.0	3.8	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.15	0.00	0.00	0.00	0.10	0.00	0.00

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Pocono Commons Dr

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Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Right Lane Group Data</b>								
Assigned Movement	0	12	0	14	0	16	0	0
Lane Assignment				R		R		
Lanes in Group	0	0	0	1	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	160.7	0.0	198.7	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	1615.6	0.0	1654.7	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	6.8	0.0	4.8	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	6.8	0.0	4.8	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	1615.6	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	9.5	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	301.1	0.0	987.8	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.534	0.000	0.201	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	301.1	0.0	987.8	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	32.2	0.0	8.1	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	1.0	0.0	0.3	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	33.2	0.0	8.4	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	3.5	0.0	1.4	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	3.6	0.0	1.5	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.63	0.00	0.13	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Intersection Summary</b>								
HCM Average Control Delay	15.2							
HCM Level of Service	B							

# HCM 2010 Signalized Intersection Capacity Analysis

## 6: SR 611 & Connector Rd

3/11/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	190	443	502	173	335	108
Movement Number	5	2	6	16	7	14
Initial Queue, veh	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00			1.00	1.00	1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1900	1900	1900	1900	1900	1900
Lanes	1	2	2	0	1	1
Lane Assignment						
Capacity, veh/h	424	3404	1764	606	0	0
Proportion Arriving On Green	0.23	0.94	0.65	0.65	0.00	0.00
Movement Delay, s/veh	24.2	0.2	6.0	6.1	0.0	0.0
Movement LOS	C	A	A	A		
Approach Volume, veh/h		703	750		0	
Approach Delay, s/veh		7.4	6.1		0.0	
Approach LOS		A	A			

Timer:	1	2	3	4	5	6	7	8
Assigned Phase		2		4	5	6		
Case No		4.0		0.0	2.0	8.0		
Phase Duration (G+Y+Rc), s		70.13		0.00	20.43	49.71		
Change Period (Y+Rc), s		4.00		4.00	4.00	4.00		
Max. Allowable Headway (MAH), s		5.21		0.00	3.80	5.21		
Maximum Green Setting (Gmax), s		66.30		25.70	16.70	45.60		
Max. Queue Clearance Time (g_c+I1), s		2.63		0.00	9.09	8.37		
Green Extension Time (g_e), s		10.65		0.00	0.34	10.08		
Probability of Phase Call (p_c)		1.000		0.000	0.984	1.000		
Probability of Max Out (p_x)		0.007		0.000	0.056	0.064		

Left-Turn Movement Data								
Assigned Movement					7	5		
Mvmt. Sat Flow, veh/h					0.00	1809.52		

Through Movement Data								
Assigned Movement		2				6		
Mvmt. Sat Flow, veh/h		3705.00				2706.27		

Right-Turn Movement Data								
Assigned Movement			12				16	
Mvmt. Sat Flow, veh/h			0.00				929.67	

Left Lane Group Data								
Assigned Movement		0	0	0	7	5	0	0
Lane Assignment						L (Prot)		
Lanes in Group		0	0	0	0	1	0	0
Group Volume (v), veh/h		0.0	0.0	0.0	0.0	211.1	0.0	0.0
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	0.0	1809.5	0.0	0.0
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	7.1	0.0	0.0
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	0.0	7.1	0.0	0.0

# HCM 2010 Signalized Intersection Capacity Analysis

## 6: SR 611 & Connector Rd

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	45.7	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	423.8	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.498	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	430.9	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	23.3	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	24.2	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	1.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment		T				T		
Lanes in Group	0	2	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	492.2	0.0	0.0	0.0	391.1	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1805.0	0.0	0.0	0.0	1900.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.6	0.0	0.0	0.0	6.3	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.6	0.0	0.0	0.0	6.3	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	3404.1	0.0	0.0	0.0	1238.2	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.145	0.000	0.000	0.000	0.316	0.000	0.000
Available Capacity (c_a), veh/h	0.0	3412.7	0.0	0.0	0.0	1238.2	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.1	0.0	0.0	0.0	5.4	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.2	0.0	0.0	0.0	6.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	-0.4	0.0	0.0	0.0	1.8	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	-0.4	0.0	0.0	0.0	2.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	-0.01	0.00	0.00	0.00	0.07	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
6: SR 611 & Connector Rd

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Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Movement	0	12	0	0	0	16	0	0
Lane Assignment	T+R							
Lanes in Group	0	0	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	358.9	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	1735.9	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	6.4	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	6.4	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.000	0.000	0.000	0.000	0.536	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	1131.3	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.317	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	1131.3	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	5.4	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM Average Control Delay	6.7
HCM Level of Service	A

**Intersection**

Intersection Delay (sec/veh): 1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	1	1	106	1	243	0	0	170	173
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	Yield	Yield	Yield	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	0	0	0	0	0	0	0	0	0	0	0
Movement Flow Rate	0	0	0	1	1	118	1	270	0	0	189	192
Number of Lanes	0	0	0	0	1	0	0	2	0	0	1	1

Major/Minor	Minor 1		Major 1			Major 2		
Conflicting Flow Rate - All	461	461	135	381	0	-	-	0
Stage 1	272	272	0	0	0	-	-	0
Stage 2	189	189	0	0	0	-	-	0
Follow-up Headway	3.5	4	3.3	2.2	-	-	-	0
Pot Capacity-1 Maneuver	501	500	893	1188	-	-	-	-
Stage 1	727	688	-	-	-	-	-	-
Stage 2	809	748	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	499.5	893	1188	-	-	-	-
Mov Capacity-2 Maneuver	-	499.5	-	-	-	-	-	-
Stage 1	727	687.3	-	-	-	-	-	-
Stage 2	809	# 0	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	9.6	0	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	SBT	SBR
Capacity (vph)			910		
HCM Control Delay (s)	8.033	0	9.6	-	-
HCM Lane VC Ratio	0.001	-	0.132	0	-
HCM Lane LOS	A	-	A	-	-
HCM 95th Percentile Queue (veh)	0.003	-	0.454	0	-

**Intersection**

Intersection Delay (sec/veh): 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	243	1	0	0	170	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	0	0	0	0	0
Movement Flow Rate	270	1	0	0	189	0
Number of Lanes	0	1	0	0	1	0

**Major/Minor**

Minor 1

Conflicting Flow Rate - All	0	378			0	-
Stage 1	0	378			0	-
Stage 2	0	0			0	-
Follow-up Headway	-	0			-	-
Pot Capacity-1 Maneuver	-	-			-	-
Stage 1	-	-			-	-
Stage 2	-	-			-	-
Mov Capacity-1 Maneuver	-	# 0			-	-
Mov Capacity-2 Maneuver	-	# 0			-	-
Stage 1	-	# 0			-	-
Stage 2	-	# 0			-	-

**Approach**

EB

SB

HCM Control Delay (s)	-	0
HCM LOS	-	A

**Lane**

EBLn1

SBL

Capacity (vph)	-	-
HCM Control Delay (s)	-	-
HCM Lane VC Ratio	-	-
HCM Lane LOS	-	-
HCM 95th Percentile Queue (veh)	-	-

# HCM 2010 Signalized Intersection Capacity Analysis

## 1: Bridge St & SR 611

3/11/2015



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	↗
Volume (vph)	516	46	169	483	108	201
Movement Number	2	12	1	6	3	18
Initial Queue, veh	0	0	0	0	0	0
Ped-Bike Adj. Factor (A <sub>pbT</sub> )		1.00	1.00		1.00	1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1891	1872	1853	1908	1806	1771
Lanes	1	1	1	1	1	1
Lane Assignment						
Capacity, veh/h	1370	1153	0	1383	237	207
Proportion Arriving On Green	0.72	0.72	0.00	0.22	0.14	0.14
Movement Delay, s/veh	5.3	3.5	0.0	17.7	36.2	108.8
Movement LOS	A	A		B	D	F
Approach Volume, veh/h	597			519	328	
Approach Delay, s/veh	5.2			17.7	83.6	
Approach LOS	A			B	F	

Timer:	1	2	3	4	5	6	7	8
Assigned Phase		2				6		8
Case No		7.0				4.0		9.0
Phase Duration (G+Y+Rc), s		69.19				69.19		18.00
Change Period (Y+Rc), s		6.00				6.00		6.00
Max. Allowable Headway (MAH), s		7.23				7.23		4.47
Maximum Green Setting (Gmax), s		56.40				71.00		12.00
Max. Queue Clearance Time (g <sub>c</sub> +I1), s		11.82				22.14		14.00
Green Extension Time (g <sub>e</sub> ), s		19.54				12.48		0.00
Probability of Phase Call (p <sub>c</sub> )		1.000				1.000		1.000
Probability of Max Out (p <sub>x</sub> )		0.250				0.213		1.000

Left-Turn Movement Data								
Assigned Movement								3
Mvmt. Sat Flow, veh/h								1719.94

Through Movement Data								
Assigned Movement		2				6		
Mvmt. Sat Flow, veh/h		1890.69				1908.20		

Right-Turn Movement Data								
Assigned Movement		12				16		18
Mvmt. Sat Flow, veh/h		1591.48				0.00		1505.24

Left Lane Group Data								
Assigned Movement		0	0	0	0	0	0	3
Lane Assignment								L
Lanes in Group		0	0	0	0	0	0	1
Group Volume (v), veh/h		0.0	0.0	0.0	0.0	0.0	0.0	113.7
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	0.0	0.0	0.0	1719.9
Queue Serve Time (g <sub>s</sub> ), s		0.0	0.0	0.0	0.0	0.0	0.0	5.3
Cycle Queue Clear Time (g <sub>c</sub> ), s		0.0	0.0	0.0	0.0	0.0	0.0	5.3

HCM 2010 Signalized Intersection Capacity Analysis  
 1: Bridge St & SR 611

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1719.9
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	63.2	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	236.7
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.480
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	236.7
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.2
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment		T				T		
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	548.9	0.0	0.0	0.0	519.4	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1890.7	0.0	0.0	0.0	1908.2	0.0	0.0
Queue Serve Time (g_s), s	0.0	9.8	0.0	0.0	0.0	20.1	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	9.8	0.0	0.0	0.0	20.1	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1370.3	0.0	0.0	0.0	1383.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.401	0.000	0.000	0.000	0.376	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1370.3	0.0	0.0	0.0	1553.8	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	0.876	0.000	0.000
Uniform Delay (d1), s/veh	0.0	4.7	0.0	0.0	0.0	17.2	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.7	0.0	0.0	0.0	0.5	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	5.3	0.0	0.0	0.0	17.7	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	2.8	0.0	0.0	0.0	10.1	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	3.0	0.0	0.0	0.0	10.3	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.08	0.00	0.00	0.00	0.44	0.00	0.00

# HCM 2010 Signalized Intersection Capacity Analysis

## 1: Bridge St & SR 611

3/11/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Right Lane Group Data</b>								
Assigned Movement	0	12	0	0	0	16	0	18
Lane Assignment	R			R				
Lanes in Group	0	1	0	0	0	0	0	1
Group Volume (v), veh/h	0.0	48.4	0.0	0.0	0.0	0.0	0.0	213.8
Group Sat. Flow (s), veh/h/ln	0.0	1591.5	0.0	0.0	0.0	0.0	0.0	1505.2
Queue Serve Time (g_s), s	0.0	0.8	0.0	0.0	0.0	0.0	0.0	12.0
Cycle Queue Clear Time (g_c), s	0.0	0.8	0.0	0.0	0.0	0.0	0.0	12.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000
Lane Group Capacity (c), veh/h	0.0	1153.4	0.0	0.0	0.0	0.0	0.0	207.2
Volume-to-Capacity Ratio (X)	0.000	0.042	0.000	0.000	0.000	0.000	0.000	1.032
Available Capacity (c_a), veh/h	0.0	1153.4	0.0	0.0	0.0	0.0	0.0	207.2
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	3.4	0.0	0.0	0.0	0.0	0.0	37.6
Incremental Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	0.0	0.0	71.2
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	3.5	0.0	0.0	0.0	0.0	0.0	108.8
First-Term Queue (Q1), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.0	4.3
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.0	8.4
Percentile Storage Ratio (RQ%)	0.00	0.03	0.00	0.00	0.00	0.00	0.00	1.48
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
<b>Intersection Summary</b>								
HCM Average Control Delay	27.5							
HCM Level of Service	C							

# HCM 2010 Signalized Intersection Capacity Analysis

## 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

3/11/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	881	42	37	598	28	32	12	38	24	3	22
Movement Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1881	1882	1882	1900	1937	1976	1986	1986	1986	2025	2025	2005
Lanes	1	1	0	1	1	1	0	1	0	0	1	1
Lane Assignment												
Capacity, veh/h	0	1337	77	277	1472	1276	87	65	49	153	18	193
Proportion Arriving On Green	0.00	0.58	0.58	0.08	0.20	0.02	0.11	0.11	0.11	0.11	0.11	0.11
Movement Delay, s/veh	0.0	0.0	15.6	52.5	20.5	12.0	51.6	0.0	0.0	38.9	0.0	38.2
Movement LOS			B	D	C	B	D			D		D
Approach Volume, veh/h		1024			717			140			57	
Approach Delay, s/veh		15.6			22.9			51.6			38.6	
Approach LOS		B			C			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2		4		6		8			
Case No			4.0		7.0		5.3		8.0			
Phase Duration (G+Y+Rc), s			78.20		16.80		78.20		16.80			
Change Period (Y+Rc), s			6.00		6.00		6.00		6.00			
Max. Allowable Headway (MAH), s			1.54		4.56		1.54		4.56			
Maximum Green Setting (Gmax), s			72.20		10.80		58.90		10.80			
Max. Queue Clearance Time (g_c+l1), s			39.94		4.76		50.13		11.93			
Green Extension Time (g_e), s			0.45		0.37		0.44		0.00			
Probability of Phase Call (p_c)			1.000		0.995		1.000		0.995			
Probability of Max Out (p_x)			0.000		0.401		0.008		1.000			
Left-Turn Movement Data												
Assigned Movement					7		1		3			
Mvmt. Sat Flow, veh/h					768.55		559.19		438.61			
Through Movement Data												
Assigned Movement			2		4		6		8			
Mvmt. Sat Flow, veh/h			1759.71		114.00		1937.25		453.96			
Right-Turn Movement Data												
Assigned Movement			12		14		16		18			
Mvmt. Sat Flow, veh/h			101.79		1697.05		1679.60		432.99			
Left Lane Group Data												
Assigned Movement		0	0	0	7	0	1	0	3			
Lane Assignment					L+T		L		L+T+R			
Lanes in Group		0	0	0	1	0	1	0	1			
Group Volume (v), veh/h		0.0	0.0	0.0	31.0	0.0	61.7	0.0	140.2			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	882.6	0.0	559.2	0.0	1325.6			
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	0.0	10.2	0.0	7.2			
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	2.8	0.0	48.1	0.0	9.9			

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	732.0	0.0	559.2	0.0	781.7
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	850.5	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	10.8	0.0	72.2	0.0	10.8
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.9	0.0	34.3	0.0	8.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	10.2	0.0	7.2
Time to First Blk (g_f), s	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.1
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.1
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.871	0.000	1.000	0.000	0.331
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	171.2	0.0	277.5	0.0	201.1
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.181	0.000	0.222	0.000	0.697
Available Capacity (c_a), veh/h	0.0	0.0	0.0	171.2	0.0	277.5	0.0	201.1
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	0.807	0.000	1.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	38.4	0.0	51.0	0.0	41.5
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	1.5	0.0	10.1
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	38.9	0.0	52.5	0.0	51.6
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.7	0.0	1.6	0.0	3.5
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.7	0.0	1.7	0.0	4.1
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.04	0.00	0.56	0.00	0.22
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	4	0	6	0	8
Lane Assignment	T							
Lanes in Group	0	0	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	622.9	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	1937.3	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	26.7	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	26.7	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	1472.3	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.423	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	1472.3	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.807	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	19.8	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	20.5	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	13.8	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	14.1	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	1.36	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 2: Commercial Driveway/Stroud Mall Main Dr & SR 611

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Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Movement	0	12	0	14	0	16	0	18
Lane Assignment		T+R		R		R		
Lanes in Group	0	1	0	1	0	1	0	0
Group Volume (v), veh/h	0.0	1024.1	0.0	25.6	0.0	32.6	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1861.5	0.0	1697.0	0.0	1679.6	0.0	0.0
Queue Serve Time (g_s), s	0.0	37.9	0.0	1.3	0.0	1.8	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	37.9	0.0	1.3	0.0	1.8	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.055	0.000	1.000	0.000	1.000	0.000	0.327
Lane Group Capacity (c), veh/h	0.0	1414.7	0.0	192.9	0.0	1276.5	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.724	0.000	0.133	0.000	0.026	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1414.7	0.0	192.9	0.0	1276.5	0.0	0.0
Upstream Filter Factor (I)	0.000	0.840	0.000	1.000	0.000	0.807	0.000	0.000
Uniform Delay (d1), s/veh	0.0	12.8	0.0	37.9	0.0	12.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	2.7	0.0	0.3	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	15.6	0.0	38.2	0.0	12.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	15.5	0.0	0.5	0.0	0.5	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	16.5	0.0	0.6	0.0	0.5	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.70	0.00	0.11	0.00	0.08	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM Average Control Delay	21.5
HCM Level of Service	C

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Stroud Mall East Dr

3/11/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations									
Volume (vph)	58	896	679	51	17	13			
Movement Number	5	2	6	16	7	14			
Initial Queue, veh	0	0	0	0	0	0			
Ped-Bike Adj. Factor (A_pbT)	1.00			1.00	1.00	1.00			
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00			
Adj. Sat. Flow Rate, veh/h/ln	1900	1863	1863	1900	1976	1937			
Lanes	1	1	1	1	1	1			
Lane Assignment									
Capacity, veh/h	0	1549	1549	1343	92	80			
Proportion Arriving On Green	0.00	0.33	0.19	0.01	0.05	0.05			
Movement Delay, s/veh	0.0	22.1	22.9	10.5	48.1	46.9			
Movement LOS		C	C	B	D	D			
Approach Volume, veh/h		996	850		46				
Approach Delay, s/veh		22.1	21.9		47.7				
Approach LOS		C	C		D				
Timer:		1	2	3	4	5	6	7	8
Assigned Phase			2		4		6		
Case No			4.0		9.0		7.0		
Phase Duration (G+Y+Rc), s			89.30		10.89		89.30		
Change Period (Y+Rc), s			6.00		6.00		6.00		
Max. Allowable Headway (MAH), s			1.42		4.54		1.42		
Maximum Green Setting (Gmax), s			83.30		6.80		72.20		
Max. Queue Clearance Time (g_c+I1), s			47.48		3.53		39.56		
Green Extension Time (g_e), s			0.34		0.02		0.34		
Probability of Phase Call (p_c)			1.000		0.720		1.000		
Probability of Max Out (p_x)			0.000		1.000		0.000		
Left-Turn Movement Data									
Assigned Movement					7				
Mvmt. Sat Flow, veh/h					1881.90				
Through Movement Data									
Assigned Movement			2				6		
Mvmt. Sat Flow, veh/h			1862.75				1862.75		
Right-Turn Movement Data									
Assigned Movement			12		14		16		
Mvmt. Sat Flow, veh/h			0.00		1646.67		1615.00		
Left Lane Group Data									
Assigned Movement		0	0	0	7	0	0	0	0
Lane Assignment					L				
Lanes in Group		0	0	0	1	0	0	0	0
Group Volume (v), veh/h		0.0	0.0	0.0	29.8	0.0	0.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	1881.9	0.0	0.0	0.0	0.0
Queue Serve Time (g_s), s		0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Stroud Mall East Dr

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	1881.9	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	83.3	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	91.9	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.325	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	127.7	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	46.1	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	48.1	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	0	0	6	0	0
Lane Assignment	T			T				
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	995.6	0.0	0.0	0.0	780.5	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1862.7	0.0	0.0	0.0	1862.7	0.0	0.0
Queue Serve Time (g_s), s	0.0	45.5	0.0	0.0	0.0	37.6	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	45.5	0.0	0.0	0.0	37.6	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1548.7	0.0	0.0	0.0	1548.7	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.643	0.000	0.000	0.000	0.504	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1548.7	0.0	0.0	0.0	1548.7	0.0	0.0
Upstream Filter Factor (I)	0.000	0.620	0.000	0.000	0.000	0.751	0.000	0.000
Uniform Delay (d1), s/veh	0.0	20.8	0.0	0.0	0.0	22.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	1.3	0.0	0.0	0.0	0.9	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.1	0.0	0.0	0.0	22.9	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	22.0	0.0	0.0	0.0	18.8	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.6	0.0	0.0	0.0	0.4	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	22.5	0.0	0.0	0.0	19.2	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	2.17	0.00	0.00	0.00	0.30	0.00	0.00

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: SR 611 & Stroud Mall East Dr

3/11/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Movement	0	12	0	14	0	16	0	0
Lane Assignment				R		R		
Lanes in Group	0	0	0	1	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	15.9	0.0	69.9	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	1646.7	0.0	1615.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.9	0.0	4.3	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.9	0.0	4.3	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	80.4	0.0	1342.7	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.197	0.000	0.052	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	111.8	0.0	1342.7	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	0.751	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	45.8	0.0	10.5	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	1.2	0.0	0.1	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	46.9	0.0	10.5	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.4	0.0	0.9	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.5	0.0	0.9	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.08	0.00	0.09	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM Average Control Delay	22.6
HCM Level of Service	C

# HCM 2010 Signalized Intersection Capacity Analysis

## 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	678	2	7	590	91	14	4	7	206	4	138
Movement Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1872	1891	1891	1890	1872	1928	1900	1900	1976	1855	1855	1947
Lanes	1	1	0	1	1	1	0	1	1	0	1	1
Lane Assignment												
Capacity, veh/h	0	1095	12	313	1098	959	62	14	69	302	10	291
Proportion Arriving On Green	0.00	0.55	0.55	0.59	0.59	0.59	0.04	0.04	0.04	0.18	0.18	0.18
Movement Delay, s/veh	0.0	0.0	16.2	22.2	13.5	8.6	45.1	0.0	43.7	51.6	0.0	35.7
Movement LOS			B	C	B	A	D		D	D		D
Approach Volume, veh/h		722			738			36			400	
Approach Delay, s/veh		16.2			13.0			44.7			45.7	
Approach LOS		B			B			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2	8	4		6					
Case No			4.0	11.0	11.0		5.3					
Phase Duration (G+Y+Rc), s			59.98	9.85	22.20		59.98					
Change Period (Y+Rc), s			6.00	6.00	6.00		6.00					
Max. Allowable Headway (MAH), s			7.25	5.00	4.96		7.25					
Maximum Green Setting (Gmax), s			59.10	6.40	16.20		48.70					
Max. Queue Clearance Time (g_c+l1), s			26.80	3.17	14.67		28.25					
Green Extension Time (g_e), s			17.32	0.02	0.34		15.77					
Probability of Phase Call (p_c)			1.000	0.612	1.000		1.000					
Probability of Max Out (p_x)			0.641	1.000	1.000		0.791					
Left-Turn Movement Data												
Assigned Movement				3	7		1					
Mvmt. Sat Flow, veh/h				1480.01	1713.05		739.09					
Through Movement Data												
Assigned Movement		2	8	4			6					
Mvmt. Sat Flow, veh/h		1866.19	345.98	55.88			1871.78					
Right-Turn Movement Data												
Assigned Movement			12	18	14		16					
Mvmt. Sat Flow, veh/h			20.92	1655.45	1654.66		1635.64					
Left Lane Group Data												
Assigned Movement		0	0	3	7	0	1	0	0			
Lane Assignment				L+T	L+T		L					
Lanes in Group		0	0	1	1	0	1	0	0			
Group Volume (v), veh/h		0.0	0.0	24.0	253.2	0.0	16.7	0.0	0.0			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	1826.0	1768.9	0.0	739.1	0.0	0.0			
Queue Serve Time (g_s), s		0.0	0.0	1.2	12.7	0.0	1.5	0.0	0.0			
Cycle Queue Clear Time (g_c), s		0.0	0.0	1.2	12.7	0.0	26.2	0.0	0.0			

# HCM 2010 Signalized Intersection Capacity Analysis

## 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	739.1	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	54.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	29.2	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.811	0.968	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	76.5	311.4	0.0	312.6	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.314	0.813	0.000	0.053	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	127.0	311.4	0.0	312.6	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	1.000	1.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	42.8	36.5	0.0	22.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	2.3	15.1	0.0	0.3	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	45.1	51.6	0.0	22.2	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.5	5.3	0.0	0.2	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	1.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.6	6.6	0.0	0.3	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.03	0.36	0.00	0.03	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	8	4	0	6	0	0
Lane Assignment	T							
Lanes in Group	0	0	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	621.1	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	1871.8	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	18.9	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	18.9	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	1097.8	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.566	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	1097.8	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	11.8	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	13.5	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	1.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	7.5	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00

# HCM 2010 Signalized Intersection Capacity Analysis

## 4: Commercial Driveway/Chipperfield Dr & SR 611

3/25/2015

Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Movement	0	12	18	14	0	16	0	0
Lane Assignment		T+R	R	R		R		
Lanes in Group	0	1	1	1	0	1	0	0
Group Volume (v), veh/h	0.0	721.7	12.1	146.8	0.0	100.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1887.1	1655.4	1654.7	0.0	1635.6	0.0	0.0
Queue Serve Time (g_s), s	0.0	24.8	0.6	7.4	0.0	2.5	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	24.8	0.6	7.4	0.0	2.5	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.011	1.000	1.000	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	1106.8	69.3	291.2	0.0	959.3	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.652	0.174	0.504	0.000	0.104	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1211.8	115.1	291.3	0.0	959.3	0.0	0.0
Upstream Filter Factor (I)	0.000	0.770	1.000	1.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	14.3	42.6	34.3	0.0	8.4	0.0	0.0
Incremental Delay (d2), s/veh	0.0	1.9	1.2	1.4	0.0	0.2	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.2	43.7	35.7	0.0	8.6	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	9.7	0.3	3.0	0.0	0.8	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.6	0.0	0.1	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	1.000	1.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	10.3	0.3	3.1	0.0	0.8	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.16	0.08	0.39	0.00	0.10	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

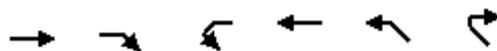
### Intersection Summary

HCM Average Control Delay	21.7
HCM Level of Service	C

# HCM Signalized Intersection Capacity Analysis

## 16: Dreher Connector Road & W Main St

3/11/2015



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations	↑	↑	↑	↑	↑	↑
Volume (vph)	254	288	36	507	49	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1900	1615	1805	1900	1805	1615
Flt Permitted	1.00	1.00	0.39	1.00	0.95	1.00
Satd. Flow (perm)	1900	1615	734	1900	1805	1615
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	282	320	40	563	54	316
RTOR Reduction (vph)	0	217	0	0	0	157
Lane Group Flow (vph)	282	103	40	563	54	159
Turn Type	NA	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4	8			2
Actuated Green, G (s)	29.1	29.1	36.7	36.7	45.3	45.3
Effective Green, g (s)	29.1	29.1	36.7	36.7	45.3	45.3
Actuated g/C Ratio	0.32	0.32	0.41	0.41	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	614	522	342	775	909	813
v/s Ratio Prot	0.15		0.00	c0.30	0.03	
v/s Ratio Perm		0.06	0.04			c0.10
v/c Ratio	0.46	0.20	0.12	0.73	0.06	0.20
Uniform Delay, d1	24.2	22.0	16.9	22.4	11.4	12.3
Progression Factor	1.00	1.00	1.55	1.51	1.00	1.00
Incremental Delay, d2	0.5	0.2	0.1	3.2	0.1	0.5
Delay (s)	24.7	22.2	26.2	37.1	11.6	12.9
Level of Service	C	C	C	D	B	B
Approach Delay (s)	23.4			36.4	12.7	
Approach LOS	C			D	B	

### Intersection Summary

HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Off Ramp/305 WB On Ramp & W Main St

6/17/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	47	491	0	0	388	149	0	0	0	106	100	107
Number	7	4	14	3	8	18				5	2	12
Initial Q, 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
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900				1900	1900	1900
Adj Flow Rate, veh/h	52	546	0	0	431	0				114	116	0
Adj No. of Lanes	1	1	0	0	1	0				1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0				0	0	0
Opposing Right Turn Influence	Yes			No						Yes		
Cap, veh/h	252	691	0	0	691	0				991	1040	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Prop Arrive On Green	0.36	0.36	0.00	0.00	0.36	0.00				0.55	0.55	0.00
Ln Grp Delay, s/veh	32.6	27.6	0.0	0.0	24.5	0.0				10.1	10.0	0.0
Ln Grp LOS	C	C			C					B	B	
Approach Vol, veh/h		598			431						230	
Approach Delay, s/veh		28.1			24.5						10.1	
Approach LOS		C			C						B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs			2		4				8			
Case No			10.0		6.0				8.0			
Phs Duration (G+Y+Rc), s			53.3		36.7				36.7			
Change Period (Y+Rc), s			4.0		4.0				4.0			
Max Green (Gmax), s			28.0		54.0				54.0			
Max Allow Headway (MAH), s			4.5		5.2				5.2			
Max Q Clear (g_c+I1), s			4.7		25.1				18.8			
Green Ext Time (g_e), s			0.9		7.6				8.0			
Prob of Phs Call (p_c)			1.00		1.00				1.00			
Prob of Max Out (p_x)			0.00		0.08				0.04			
<b>Left-Turn Movement Data</b>												
Assigned Mvmt			5		7				3			
Mvmt Sat Flow, veh/h			1810		972				0			
<b>Through Movement Data</b>												
Assigned Mvmt			2		4				8			
Mvmt Sat Flow, veh/h			1900		1900				1900			
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12		14				18			
Mvmt Sat Flow, veh/h			0		0				0			
<b>Left Lane Group Data</b>												
Assigned Mvmt		0	5	0	7	0	0	0	3			
Lane Assignment												
Lanes in Grp		0	1	0	1	0	0	0	0			

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Off Ramp/305 WB On Ramp & W Main St

6/17/2015

Grp Vol (v), veh/h	0	114	0	52	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1810	0	972	0	0	0	0
Q Serve Time (g_s), s	0.0	2.7	0.0	4.2	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	2.7	0.0	21.0	0.0	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	1810	0	972	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	32.7	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	15.9	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.7
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	991	0	252	0	0	0	0
V/C Ratio (X)	0.00	0.12	0.00	0.21	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	991	0	482	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	9.8	0.0	32.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.4	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
Control Delay (d), s/veh	0.0	10.1	0.0	32.6	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	1.4	0.0	1.1	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (-26165%), veh/ln	0.0	1.4	0.0	1.2	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	0.58	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	0	4	0	0	0	8
Lane Assignment		T		T				T
Lanes in Grp	0	1	0	1	0	0	0	1
Grp Vol (v), veh/h	0	116	0	546	0	0	0	431
Grp Sat Flow (s), veh/h/ln	0	1900	0	1900	0	0	0	1900
Q Serve Time (g_s), s	0.0	2.6	0.0	23.1	0.0	0.0	0.0	16.8
Cycle Q Clear Time (g_c), s	0.0	2.6	0.0	23.1	0.0	0.0	0.0	16.8
Lane Grp Cap (c), veh/h	0	1040	0	691	0	0	0	691
V/C Ratio (X)	0.00	0.11	0.00	0.79	0.00	0.00	0.00	0.62
Avail Cap (c_a), veh/h	0	1040	0	1140	0	0	0	1140
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	9.8	0.0	25.6	0.0	0.0	0.0	23.6
Incr Delay (d2), s/veh	0.0	0.2	0.0	2.1	0.0	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
Control Delay (d), s/veh	0.0	10.0	0.0	27.6	0.0	0.0	0.0	24.5
1st-Term Q (Q1), veh/ln	0.0	1.4	0.0	12.1	0.0	0.0	0.0	8.7
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.2

HCM 2010 Signalized Intersection Capacity Analysis  
 22: 305 WB Off Ramp/305 WB On Ramp & W Main St

6/17/2015

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (-26165%), veh/ln	0.0	1.4	0.0	12.5	0.0	0.0	0.0	8.9
%ile Storage Ratio (RQ%)	0.00	0.04	0.00	1.15	0.00	0.00	0.00	1.32
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	0	0	18
Lane Assignment								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	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
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (-26165%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 2010 Ctrl Delay	23.6
HCM 2010 LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

HCM 2010 TWSC

25: 305 EB Exit and On Ramps/Dreher Connector Road & 305 EB On and Exit Ramps 3/11/2015

**Intersection**

Intersection Delay (sec/veh): 9.3

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Volume (vph)	324	10	10	219	114	333
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	Yield	Yield	None	None
Storage Length	200			100	150	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	0	0	0	0	0
Movement Flow Rate	360	11	11	243	127	370
Number of Lanes	1	1	1	1	1	1

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	254	0	0	0	742	11
Stage 1	0	0	0	0	11	0
Stage 2		0	0	0	731	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1325	-	-	-	386	1085
Stage 1	-	-	-	-	1017	-
Stage 2	-	-	-	-	480	-
Mov Capacity-1 Maneuver	1325	-	-	-	281	1085
Mov Capacity-2 Maneuver	-	-	-	-	281	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	349.4	-

Approach	EB	WB	SW
HCM Control Delay (s)	8.5	0	14.565
HCM LOS	A	A	B

Lane	EBL	EBT	WBT	WBR	SWLn1	SWLn2
Capacity (vph)					281	1085
HCM Control Delay (s)	8.727	-	-	-	27.9	10
HCM Lane VC Ratio	0.272	-	0	-	0.451	0.341
HCM Lane LOS	A	-	-	-	D	B
HCM 95th Percentile Queue (veh)	1.109	-	0	-	2.209	1.526

**Intersection**

Intersection Delay (sec/veh): 4.6

Movement	EBL	EBR	NEL	NET	SWT	SWR
Volume (vph)	80	34	138	129	115	81
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	Yield	Yield	Yield	Yield	None	None
Storage Length	0	100	150			0
Median Width	12			12	12	
Grade (%)	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	0	0	0	0	0
Movement Flow Rate	89	38	153	143	128	90
Number of Lanes	1	1	1	1	1	1

**Major/Minor**

	Major 1				Major 2	
Conflicting Flow Rate - All	578	128	218	0	0	0
Stage 1	128	0	0	0	0	0
Stage 2	450	0	0	0	0	0
Follow-up Headway	3.5	3.3	2.2	-	0	0
Pot Capacity-1 Maneuver	481	930	1366	-	-	-
Stage 1	903	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Mov Capacity-1 Maneuver	427.1	930	1366	-	-	-
Mov Capacity-2 Maneuver	427.1	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	574.5	-	-	-	-	-

**Approach**

	EB	NE	SW
HCM Control Delay (s)	13.632	4.1	0
HCM LOS	B	A	A

**Lane**

	NEL	NET	EBLn1	EBLn2	SWT	SWR
Capacity (vph)			427	930		
HCM Control Delay (s)	7.968	-	15.6	9	-	-
HCM Lane VC Ratio	0.112	-	0.208	0.041	0	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th Percentile Queue (veh)	0.378	-	0.775	0.127	0	-

HCM 2010 Signalized Intersection Capacity Analysis  
 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

3/11/2015

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	76	1	284	177	389	0	0	116	296
Movement Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1900	1900	1900	1863	1863	1863	1872	1872	1900	1900	1863	1863
Lanes	0	0	0	0	1	1	1	1	0	0	1	1
Lane Assignment												
Capacity, veh/h	0	0	0	287	4	259	0	1293	0	0	1287	1094
Proportion Arriving On Green	0.00	0.00	0.00	0.16	0.16	0.16	0.00	0.69	0.00	0.00	0.69	0.69
Movement Delay, s/veh	0.0	0.0	0.0	20.7	0.0	103.9	0.0	4.1	0.0	0.0	3.0	4.0
Movement LOS				C		F		A			A	A
Approach Volume, veh/h		0			365			423			448	
Approach Delay, s/veh		0.0			84.9			4.1			3.7	
Approach LOS					F			A			A	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2	8			6					
Case No			4.0	11.0			7.0					
Phase Duration (G+Y+Rc), s			42.00	13.00			42.00					
Change Period (Y+Rc), s			4.00	4.00			4.00					
Max. Allowable Headway (MAH), s			4.71	4.33			4.71					
Maximum Green Setting (Gmax), s			38.00	9.00			29.30					
Max. Queue Clearance Time (g_c+l1), s			6.96	11.00			6.34					
Green Extension Time (g_e), s			4.79	0.00			4.53					
Probability of Phase Call (p_c)			1.000	0.996			1.000					
Probability of Max Out (p_x)			0.010	1.000			0.041					
<b>Left-Turn Movement Data</b>												
Assigned Movement				3								
Mvmt. Sat Flow, veh/h				1752.09								
<b>Through Movement Data</b>												
Assigned Movement			2	8			6					
Mvmt. Sat Flow, veh/h			1872.06	23.06			1862.75					
<b>Right-Turn Movement Data</b>												
Assigned Movement			12	18			16					
Mvmt. Sat Flow, veh/h			0.00	1583.33			1583.33					
<b>Left Lane Group Data</b>												
Assigned Movement		0	0	3	0	0	0	0	0			
Lane Assignment				L+T								
Lanes in Group		0	0	1	0	0	0	0	0			
Group Volume (v), veh/h		0.0	0.0	83.7	0.0	0.0	0.0	0.0	0.0			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	1775.1	0.0	0.0	0.0	0.0	0.0			
Queue Serve Time (g_s), s		0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0			
Cycle Queue Clear Time (g_c), s		0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0			

# HCM 2010 Signalized Intersection Capacity Analysis

## 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

3/11/2015

Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	38.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion LT Inside Lane (P_L)	0.000	0.000	0.987	0.000	0.000	0.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	290.5	0.0	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.288	0.000	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	290.5	0.0	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	20.2	0.0	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	20.7	0.0	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	8	0	0	6	0	0
Lane Assignment		T				T		
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	422.8	0.0	0.0	0.0	126.1	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1872.1	0.0	0.0	0.0	1862.7	0.0	0.0
Queue Serve Time (g_s), s	0.0	5.0	0.0	0.0	0.0	1.2	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	5.0	0.0	0.0	0.0	1.2	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	1293.4	0.0	0.0	0.0	1287.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.327	0.000	0.000	0.000	0.098	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1293.4	0.0	0.0	0.0	1287.0	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	3.4	0.0	0.0	0.0	2.8	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.7	0.0	0.0	0.0	0.2	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	4.1	0.0	0.0	0.0	3.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.9	0.0	0.0	0.0	0.2	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	1.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	1.1	0.0	0.0	0.0	0.3	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.15	0.00	0.00	0.00	0.05	0.00	0.00

HCM 2010 Signalized Intersection Capacity Analysis  
 3: Broad St & 307 WB On Ramp/307 WB Exit Ramp

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Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Right Lane Group Data</b>								
Assigned Movement	0	12	18	0	0	16	0	0
Lane Assignment			R			R		
Lanes in Group	0	0	1	0	0	1	0	0
Group Volume (v), veh/h	0.0	0.0	281.5	0.0	0.0	321.7	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	1583.3	0.0	0.0	1583.3	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	9.0	0.0	0.0	4.3	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	9.0	0.0	0.0	4.3	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.000	1.000	0.000	0.000	1.000	0.000	0.000
Lane Group Capacity (c), veh/h	0.0	0.0	259.1	0.0	0.0	1093.9	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	1.087	0.000	0.000	0.294	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	259.1	0.0	0.0	1093.9	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	1.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	23.0	0.0	0.0	3.3	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	80.9	0.0	0.0	0.7	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	103.9	0.0	0.0	4.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	3.1	0.0	0.0	0.7	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	5.8	0.0	0.0	0.2	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	1.000	0.000	0.000	1.000	0.000	0.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	8.9	0.0	0.0	0.9	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	4.52	0.00	0.00	0.44	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	5.6	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
<b>Intersection Summary</b>								
HCM Average Control Delay	27.8							
HCM Level of Service	C							

Intersection							
Intersection Delay (sec/veh):	0.8						
<b>Movement</b>	<b>WBL</b>	<b>WBR</b>	<b>NBT</b>	<b>NBR</b>	<b>SBL</b>	<b>SBT</b>	<b>Lane</b>
Volume (vph)	0	0	566	147	72	Capacity (vph)	
Conflicting Peds. (#/hr)	0	0	0	0	HCM Control	Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	HCM Lane	VC Ratio
Right Turn Channelized	None	None	None	None	None	HCM Lane	LOS
Storage Length	0	0	HCM 95th Per		75th Percentile Queue (veh)		0
Median Width	0		12			12	
Grade (%)	0%		-1%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles(%)	2	2	2	2	2	2	
Movement Flow Rate	0	0	615	160	78	130	
Number of Lanes	0	0	1	0	1	1	
<b>Major/Minor</b>			<b>Major 1</b>		<b>Major 2</b>		
Conflicting Flow Rate - All			0	0	775	0	
Stage 1			3.602936E-314	3.602936E-314	0	0	
Stage 2			6.023726E-313	6.023726E-313	0	0	
Follow-up Headway			-	-	2.218	0	
Pot Capacity-1 Maneuver			-	-	841	-	
Stage 1			-	-	-	-	
Stage 2			-	-	-	-	
Mov Capacity-1 Maneuver			-	-	841	-	
Mov Capacity-2 Maneuver			-	-	-	-	
Stage 1			-	-	-	-	
Stage 2			-	-	-	-	
<b>Approach</b>			<b>NB</b>		<b>SB</b>		
HCM Control Delay (s)			0		3.6		
HCM LOS			A		A		

HCM 2010 TWSC  
 15: Seventh St & 307 EB Exit Ramp

3/11/2015

**Intersection**

Intersection Delay (sec/veh): 1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	516	0	202	10	0	10	0	109	0	0	68	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	Yield	Yield	Yield	None								
Storage Length	0		50	20		0	0		0	0		0
Median Width		12			12			0				0
Grade (%)		0%			0%			-5%				0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles(%)	2	2	2	2	2	2	2	2	2	2	2	2
Movement Flow Rate	561	0	220	11	0	11	0	118	0	0	74	0
Number of Lanes	1	0	1	1	0	1	0	1	0	0	1	0

Major/Minor	Minor 1		Minor 1		Major 1		Major 2	
Conflicting Flow Rate - All	198	-	74	302	-	118	-	0
Stage 1	74	-	0	118	-	5.72908863565564E-313		0
Stage 2	124	-	0	184	-	4.44746376157798E252		0
Follow-up Headway	3.518	-	3.318	3.518	-	3.318	-	0
Pot Capacity-1 Maneuver	761	-	990	650	-	932	-	-
Stage 1	935	-	-	887	-	-	-	-
Stage 2	880	-	-	818	-	-	-	-
Mov Capacity-1 Maneuver	-	-	990	-	-	932	-	-
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	-
Stage 1	935	-	-	887	-	-	-	-
Stage 2	869.7	-	-	636.6	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay (s)	2.01	3.95	0	0
HCM LOS	A	A	A	A

Lane	NBT	#	EBLn1	EBLn2	WBLn1	WBLn2	SBT
Capacity (vph)			-	990	-	932	
HCM Control Delay (s)	-	-	-	9.7	-	8.9	-
HCM Lane VC Ratio	0	0	-	0.222	-	0.012	0
HCM Lane LOS	-	-	-	A	-	A	-
HCM 95th Percentile Queue (veh)	0	0	-	0.848	-	0.035	0

# HCM Signalized Intersection Capacity Analysis

## 8: Dreher Ave/School Drive & Main Street

3/11/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	432	40	161	345	207	28	66	183	103	28	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	12	14	12	14	16	14	14	12
Grade (%)		-1%			0%			1%			1%	
Total Lost time (s)	5.0	5.0		5.0	5.0	7.0	4.0	4.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.88		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1337	1729		1525	1613	1397	1483	1535		1567	1486	
Flt Permitted	0.54	1.00		0.13	1.00	1.00	0.70	1.00		0.24	1.00	
Satd. Flow (perm)	758	1729		202	1613	1397	1091	1535		396	1486	
Peak-hour factor, PHF	0.92	0.86	0.92	0.91	0.92	0.92	0.81	0.92	0.77	0.92	0.92	0.92
Adj. Flow (vph)	123	502	43	177	375	225	35	72	238	112	30	59
RTOR Reduction (vph)	0	2	0	0	0	122	0	79	0	0	46	0
Lane Group Flow (vph)	123	543	0	177	375	104	35	231	0	112	43	0
Heavy Vehicles (%)	18%	4%	14%	3%	6%	11%	9%	10%	3%	10%	10%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	51.0	51.0		69.0	69.0	69.0	34.0	34.0		34.0	34.0	
Effective Green, g (s)	53.0	53.0		71.0	71.0	69.0	36.0	36.0		34.0	34.0	
Actuated g/C Ratio	0.35	0.35		0.47	0.47	0.46	0.24	0.24		0.23	0.23	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	268	611		210	763	643	262	368		90	337	
v/s Ratio Prot		c0.31		c0.07	0.23			0.15			0.03	
v/s Ratio Perm	0.16			0.32		0.07	0.03			c0.28		
v/c Ratio	0.46	0.89		0.84	0.49	0.16	0.13	0.63		1.24	0.13	
Uniform Delay, d1	37.4	45.7		31.3	27.1	23.6	44.8	51.0		58.0	46.2	
Progression Factor	1.00	1.00		1.73	0.95	1.80	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.6	17.5		24.5	2.2	0.5	0.2	3.3		174.3	0.2	
Delay (s)	43.0	63.2		78.6	27.9	43.0	45.0	54.3		232.3	46.4	
Level of Service	D	E		E	C	D	D	D		F	D	
Approach Delay (s)		59.5			43.8			53.4			150.0	
Approach LOS		E			D			D			F	

### Intersection Summary

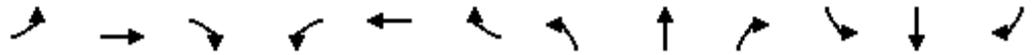
HCM Average Control Delay	61.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	50.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 9: 9th St & Main Street

3/11/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕	↕		↕		↕	↕	
Volume (vph)	150	391	14	1	321	133	29	56	49	256	6	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	11	11	11	10	10	10
Grade (%)		4%			1%			5%			-2%	
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		1.00		1.00	1.00	
Frt		0.99			1.00	0.85		0.95		1.00	0.86	
Flt Protected		0.98			1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)		2718			1597	1252		1494		1516	1375	
Flt Permitted		0.61			1.00	1.00		0.93		0.55	1.00	
Satd. Flow (perm)		1688			1593	1252		1405		881	1375	
Peak-hour factor, PHF	0.57	0.85	0.35	0.50	0.81	0.77	0.77	0.64	0.72	0.91	1.00	0.55
Adj. Flow (vph)	263	460	40	2	396	173	38	88	68	281	6	75
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	763	0	0	398	173	0	194	0	281	81	0
Heavy Vehicles (%)	9%	3%	0%	0%	3%	4%	2%	3%	0%	1%	13%	0%
Parking (#/hr)		0	0			0						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8				4
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)		66.8			66.8	66.8		48.7		48.7	48.7	
Effective Green, g (s)		67.3			67.3	67.3		50.7		50.7	50.7	
Actuated g/C Ratio		0.45			0.45	0.45		0.34		0.34	0.34	
Clearance Time (s)		4.5			4.5	4.5		6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)		757			715	562		475		298	465	
v/s Ratio Prot											0.06	
v/s Ratio Perm		c0.45			0.25	0.14		0.14		c0.32		
v/c Ratio		1.17dl			0.56	0.31		0.41		0.94	0.17	
Uniform Delay, d1		41.4			30.4	26.5		38.1		48.2	34.9	
Progression Factor		0.88			0.66	0.69		1.00		1.00	1.00	
Incremental Delay, d2		23.8			2.5	1.1		0.6		37.0	0.2	
Delay (s)		60.0			22.6	19.4		38.7		85.2	35.1	
Level of Service		E			C	B		D		F	D	
Approach Delay (s)		60.0			21.7			38.7			74.0	
Approach LOS		E			C			D			E	

### Intersection Summary

HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	32.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 10: 8th St & Main Street/Main Street

3/11/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Volume (vph)	45	593	39	8	384	14	65	47	40	56	19	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	13	13	13	10	10	10	10	10	10
Grade (%)		0%			0%			1%			-1%	
Total Lost time (s)		2.5			2.5			3.5			3.5	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frt		0.99			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3502			1772			1760			1624	
Flt Permitted		0.87			0.97			0.83			0.75	
Satd. Flow (perm)		3021			1733			1405			1397	
Peak-hour factor, PHF	0.73	0.93	0.69	0.50	0.86	0.67	0.90	0.79	0.67	0.77	0.68	0.77
Adj. Flow (vph)	62	638	57	16	447	21	72	59	60	73	28	52
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	757	0	0	484	0	0	191	0	0	153	0
Heavy Vehicles (%)	7%	2%	5%	0%	1%	0%	3%	0%	3%	2%	0%	2%
Parking (#/hr)		0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		29.6			29.6			15.4			15.4	
Effective Green, g (s)		31.6			31.6			17.4			17.4	
Actuated g/C Ratio		0.42			0.42			0.23			0.23	
Clearance Time (s)		4.5			4.5			5.5			5.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1273			730			326			324	
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.28			c0.14			0.11	
v/c Ratio		0.59			0.66			0.59			0.47	
Uniform Delay, d1		16.8			17.4			25.6			24.8	
Progression Factor		0.88			1.13			1.00			1.00	
Incremental Delay, d2		0.8			2.3			2.7			1.1	
Delay (s)		15.6			22.0			28.3			25.9	
Level of Service		B			C			C			C	
Approach Delay (s)		15.6			22.0			28.3			25.9	
Approach LOS		B			C			C			C	

### Intersection Summary

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 11: Seventh St/7th St & Main Street /Main Street

3/26/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕↕			↕↕			↕↕	
Volume (vph)	17	368	20	4	227	13	158	106	138	37	13	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	13	13	13	14	14	14	11	11	11
Grade (%)		-1%			2%			4%			-1%	
Total Lost time (s)		3.0			3.0			3.0			3.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frt		0.99			0.99			0.96			0.95	
Flt Protected		1.00			1.00			0.98			0.97	
Satd. Flow (prot)		2890			1542			1617			1383	
Flt Permitted		0.93			0.99			0.78			0.63	
Satd. Flow (perm)		2692			1532			1287			888	
Peak-hour factor, PHF	0.82	0.79	0.81	0.75	0.74	0.46	0.59	0.72	0.79	0.48	0.86	0.58
Adj. Flow (vph)	21	466	25	5	307	28	268	147	175	77	15	53
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	512	0	0	340	0	0	590	0	0	145	0
Heavy Vehicles (%)	0%	3%	1%	0%	1%	0%	4%	3%	4%	0%	1%	0%
Parking (#/hr)		0	0	0	0	0				0	0	0
Turn Type	Perm	NA										
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		58.0			58.0			60.0			60.0	
Effective Green, g (s)		60.0			60.0			62.0			62.0	
Actuated g/C Ratio		0.40			0.40			0.41			0.41	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1077			613			532			367	
v/s Ratio Prot												
v/s Ratio Perm		0.19			0.22			0.46			0.16	
v/c Ratio		0.48			0.55			1.11			0.40	
Uniform Delay, d1		33.3			34.7			44.0			30.9	
Progression Factor		0.66			0.75			0.61			1.00	
Incremental Delay, d2		1.3			3.5			68.5			0.7	
Delay (s)		23.3			29.5			95.4			31.6	
Level of Service		C			C			F			C	
Approach Delay (s)		23.3			29.5			95.4			31.6	
Approach LOS		C			C			F			C	

### Intersection Summary

HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

# HCM Signalized Intersection Capacity Analysis

## 12: Seventh St & Ann St

3/26/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕			↕			↕	
Volume (vph)	0	0	0	13	225	21	155	469	0	0	34	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	16	16	16	16	16	16	10	10	10
Grade (%)		0%			2%			-5%			0%	
Total Lost time (s)					4.0			4.5			4.5	
Lane Util. Factor					1.00			1.00			1.00	
Frt					0.99			1.00			0.92	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					1869			2143			1459	
Flt Permitted					1.00			0.89			1.00	
Satd. Flow (perm)					1869			1924			1459	
Peak-hour factor, PHF	0.92	0.92	0.92	0.52	0.82	0.69	0.82	0.80	0.92	0.92	0.91	0.73
Adj. Flow (vph)	0	0	0	25	274	30	189	586	0	0	37	58
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	26	0
Lane Group Flow (vph)	0	0	0	0	327	0	0	775	0	0	69	0
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%	1%	2%	0%	0%	1%	0%
Parking (#/hr)				0	0	0					0	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					6		3	8			4	
Permitted Phases				6			8					
Actuated Green, G (s)					56.9			82.6			82.6	
Effective Green, g (s)					57.9			83.6			83.6	
Actuated g/C Ratio					0.39			0.56			0.56	
Clearance Time (s)					5.0			5.5			5.5	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					721			1072			813	
v/s Ratio Prot											0.05	
v/s Ratio Perm					0.18			0.40				
v/c Ratio					0.45			0.72			0.09	
Uniform Delay, d1					34.3			24.6			15.4	
Progression Factor					1.00			1.00			0.46	
Incremental Delay, d2					2.1			2.4			0.0	
Delay (s)					36.3			27.1			7.2	
Level of Service					D			C			A	
Approach Delay (s)		0.0			36.3			27.1			7.2	
Approach LOS		A			D			C			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			28.0		HCM Level of Service						C	
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)						8.5	
Intersection Capacity Utilization			60.8%		ICU Level of Service						B	
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 13: 6th St & Main Street

3/26/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕			↕			↕				
Volume (vph)	104	520	14	8	244	45	10	69	36	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	16	16	16	11	11	11	12	12	12
Grade (%)		-1%			2%			-1%			0%	
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		0.95			1.00			1.00				
Frt		1.00			0.98			0.96				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		2932			1671			1571				
Flt Permitted		0.74			0.97			1.00				
Satd. Flow (perm)		2202			1617			1571				
Peak-hour factor, PHF	0.61	0.90	0.68	0.63	0.83	0.71	0.79	0.68	0.80	0.92	0.92	0.92
Adj. Flow (vph)	170	578	21	13	294	63	13	101	45	0	0	0
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	768	0	0	367	0	0	159	0	0	0	0
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	2%	0%	0%	0%	0%
Parking (#/hr)		0	0	0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		2			6			4				
Permitted Phases	2			6			4					
Actuated Green, G (s)		100.3			100.3			20.7				
Effective Green, g (s)		101.3			101.3			21.7				
Actuated g/C Ratio		0.68			0.68			0.14				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1487			1092			227				
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.23			0.10				
v/c Ratio		0.52			0.34			0.70				
Uniform Delay, d1		12.1			10.2			61.1				
Progression Factor		0.63			1.03			1.00				
Incremental Delay, d2		1.1			0.8			9.4				
Delay (s)		8.7			11.3			70.4				
Level of Service		A			B			E				
Approach Delay (s)		8.7			11.3			70.4			0.0	
Approach LOS		A			B			E			A	
<b>Intersection Summary</b>												
HCM Average Control Delay			17.0									B
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			150.0						27.0			
Intersection Capacity Utilization			54.7%									A
Analysis Period (min)			15									
c Critical Lane Group												

# HCM Signalized Intersection Capacity Analysis

## 14: Ann St & Broad St/5th St & Main Street

3/11/2015



Movement	EBT	EBR	NBL2	NBR	SBL	SBT	SBR2
Lane Configurations	↑↑		↖	↗	↖	↑	↗
Volume (vph)	353	115	200	507	87	443	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	10	11	10	10	11
Grade (%)	-5%			2%			
Total Lost time (s)	4.5		6.5	4.0	4.0	4.0	6.5
Lane Util. Factor	0.95		1.00	1.00	1.00	1.00	1.00
Frt	0.96		1.00	0.85	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3372		1509	1398	1752	1793	1377
Flt Permitted	1.00		0.28	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3372		452	1398	1752	1792	1377
Peak-hour factor, PHF	0.92	0.91	0.91	0.96	0.81	0.95	0.91
Adj. Flow (vph)	384	126	220	528	107	466	289
RTOR Reduction (vph)	0	0	0	0	0	0	100
Lane Group Flow (vph)	510	0	220	528	107	466	189
Heavy Vehicles (%)	0%	0%	1%	1%	3%	2%	1%
Turn Type	NA		custom	custom	pm+pt	NA	custom
Protected Phases	8		1	6	5	2	
Permitted Phases			6		2		2 8
Actuated Green, G (s)	25.7		88.8	76.7	71.7	66.1	98.3
Effective Green, g (s)	28.2		88.8	79.2	76.7	68.6	98.3
Actuated g/C Ratio	0.19		0.59	0.53	0.51	0.46	0.66
Clearance Time (s)	7.0		6.5	6.5	6.5	6.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	634		382	738	896	820	902
v/s Ratio Prot	c0.15		c0.06	c0.38	0.01	0.26	
v/s Ratio Perm			0.28		0.05		0.14
v/c Ratio	0.80		0.58	0.72	0.12	0.57	0.21
Uniform Delay, d1	58.3		19.0	26.9	19.1	29.8	10.3
Progression Factor	0.69		1.00	1.00	0.99	1.02	2.01
Incremental Delay, d2	6.4		2.1	3.3	0.1	2.8	0.1
Delay (s)	46.5		21.1	30.2	19.0	33.3	20.9
Level of Service	D		C	C	B	C	C
Approach Delay (s)	46.5					27.4	
Approach LOS	D					C	

### Intersection Summary

HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	37.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 2010 Signalized Intersection Capacity Analysis  
 24: 5th St & Sarah St

3/11/2015

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	34	72	2	243	99	27	53	1	18	308	93
Movement Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj. Factor (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj. Factors	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Sat. Flow Rate, veh/h/ln	1832	1832	1832	1650	1650	1650	1590	1590	1590	1850	1850	1850
Lanes	0	1	0	0	1	1	0	1	0	0	1	0
Lane Assignment												
Capacity, veh/h	0	153	300	100	499	430	280	283	8	119	551	183
Proportion Arriving On Green	0.00	0.31	0.31	0.31	0.31	0.31	0.44	0.44	0.44	0.44	0.44	0.44
Movement Delay, s/veh	0.0	0.0	10.1	11.6	0.0	10.1	6.7	0.0	0.0	9.1	0.0	0.0
Movement LOS			B	B		B	A			A		
Approach Volume, veh/h		118			408			114			465	
Approach Delay, s/veh		10.1			11.2			6.7			9.1	
Approach LOS		B			B			A			A	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phase			2		4	5	6		8			
Case No			4.0		8.0	0.0	7.3		8.0			
Phase Duration (G+Y+Rc), s			15.48		21.95	0.00	15.48		21.95			
Change Period (Y+Rc), s			5.50		7.00	5.50	5.50		7.00			
Max. Allowable Headway (MAH), s			4.18		9.39	0.00	4.18		9.39			
Maximum Green Setting (Gmax), s			33.50		19.00	5.00	23.00		19.00			
Max. Queue Clearance Time (g_c+I1), s			4.26		9.46	0.00	7.61		3.63			
Green Extension Time (g_e), s			2.00		5.49	0.00	1.76		7.96			
Probability of Phase Call (p_c)			0.998		1.000	0.000	0.996		1.000			
Probability of Max Out (p_x)			0.000		0.991	0.000	0.016		0.696			
<b>Left-Turn Movement Data</b>												
Assigned Movement					7	5	1		3			
Mvmt. Sat Flow, veh/h					88.34	0.00	22.30		430.03			
<b>Through Movement Data</b>												
Assigned Movement			2		4		6		8			
Mvmt. Sat Flow, veh/h			499.30		1206.04		1613.01		536.27			
<b>Right-Turn Movement Data</b>												
Assigned Movement			12		14		16		18			
Mvmt. Sat Flow, veh/h			976.89		417.45		1402.63		17.20			
<b>Left Lane Group Data</b>												
Assigned Movement		0	0	0	7	5	1	0	3			
Lane Assignment					L+T+R		L+T		L+T+R			
Lanes in Group		0	0	0	1	0	1	0	1			
Group Volume (v), veh/h		0.0	0.0	0.0	465.1	0.0	293.3	0.0	114.4			
Group Sat. Flow (s), veh/h/ln		0.0	0.0	0.0	1711.8	0.0	1635.3	0.0	983.5			
Queue Serve Time (g_s), s		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Cycle Queue Clear Time (g_c), s		0.0	0.0	0.0	7.5	0.0	5.6	0.0	1.6			

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Perm LT Sat Flow Rate (s_l), veh/h/ln	0.0	0.0	0.0	744.2	0.0	707.8	0.0	589.9
Shared LT Sat Flow (s_sh), veh/h/ln	0.0	0.0	0.0	1849.8	0.0	1650.2	0.0	996.8
Perm LT Eff. Green (g_p), s	0.0	0.0	0.0	16.5	0.0	11.5	0.0	16.5
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	14.8	0.0	9.2	0.0	9.0
Perm LT Que Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	8.4	0.0	6.9	0.0	2.6
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	7.5	0.0	5.6	0.0	1.6
Proportion LT Inside Lane (P_L)	0.000	0.000	0.000	0.052	0.000	0.014	0.000	0.437
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	853.5	0.0	599.0	0.0	570.5
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.545	0.000	0.490	0.000	0.200
Available Capacity (c_a), veh/h	0.0	0.0	0.0	1031.6	0.0	1160.1	0.0	657.6
Upstream Filter Factor (I)	0.000	0.000	0.000	1.000	0.000	1.000	0.000	1.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	8.0	0.0	10.9	0.0	6.3
Incremental Delay (d2), s/veh	0.0	0.0	0.0	1.2	0.0	0.6	0.0	0.4
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	9.1	0.0	11.6	0.0	6.7
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	1.7	0.0	1.5	0.0	0.3
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.1
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	0.000	0.000	1.000	1.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	2.0	0.0	1.6	0.0	0.4
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.16	0.00	0.09	0.00	0.03
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Movement	0	2	0	4	0	6	0	8
Lane Assignment								
Lanes in Group	0	0	0	0	0	0	0	0
Group Volume (v), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Capacity (c), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Available Capacity (c_a), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upstream Filter Factor (I)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Movement	0	12	0	14	0	16	0	18
Lane Assignment	T+R			R				
Lanes in Group	0	1	0	0	0	1	0	0
Group Volume (v), veh/h	0.0	118.3	0.0	0.0	0.0	115.1	0.0	0.0
Group Sat. Flow (s), veh/h/ln	0.0	1476.2	0.0	0.0	0.0	1402.6	0.0	0.0
Queue Serve Time (g_s), s	0.0	2.3	0.0	0.0	0.0	2.3	0.0	0.0
Cycle Queue Clear Time (g_c), s	0.0	2.3	0.0	0.0	0.0	2.3	0.0	0.0
Prot RT Sat Flow Rate (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff. Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Proportion RT Outside Lane (P_R)	0.000	0.662	0.000	0.244	0.000	1.000	0.000	0.017
Lane Group Capacity (c), veh/h	0.0	452.7	0.0	0.0	0.0	430.2	0.0	0.0
Volume-to-Capacity Ratio (X)	0.000	0.261	0.000	0.000	0.000	0.268	0.000	0.000
Available Capacity (c_a), veh/h	0.0	1380.3	0.0	0.0	0.0	918.0	0.0	0.0
Upstream Filter Factor (I)	0.000	1.000	0.000	0.000	0.000	1.000	0.000	0.000
Uniform Delay (d1), s/veh	0.0	9.8	0.0	0.0	0.0	9.8	0.0	0.0
Incremental Delay (d2), s/veh	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0
Initial Queue Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	10.1	0.0	0.0	0.0	10.1	0.0	0.0
First-Term Queue (Q1), veh/ln	0.0	0.6	0.0	0.0	0.0	0.5	0.0	0.0
Second-Term Queue (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Third-Term Queue (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Percentile bk-of-que factor (f_B%)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Percentile Back of Queue (Q%), veh/ln	0.0	0.6	0.0	0.0	0.0	0.6	0.0	0.0
Percentile Storage Ratio (RQ%)	0.00	0.04	0.00	0.00	0.00	0.09	0.00	0.00
Initial Queue (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Queue (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Queue (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saturated Capacity (cs), veh/h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Queue Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM Average Control Delay	9.7
HCM Level of Service	A

**Intersection**

Intersection Delay (sec/veh): 6.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	0	0	551	74	0	356
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	Free	Free	None	None
Storage Length	0			0	0	0
Median Width		0	0		0	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles(%)	2	2	2	2	2	2
Movement Flow Rate	0	0	599	80	0	387
Number of Lanes	0	0	2	0	0	1

**Major/Minor Major 2**

Conflicting Flow Rate - All	0	0	-	340
Stage 1	0	0	-	0
Stage 2	0	0	-	0
Follow-up Headway	0	0	-	3.32
Pot Capacity-1 Maneuver	-	-	-	655
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	-	-	655
Mov Capacity-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

**Approach SB SE**

HCM Control Delay (s)	0	18.1
HCM LOS	A	C

**Lane SELn1 SBT SBR**

Capacity (vph)	655		
HCM Control Delay (s)	18.1	-	-
HCM Lane VC Ratio	0.591	0	-
HCM Lane LOS	C	-	-
HCM 95th Percentile Queue (veh)	3.881	0	-

# HCM Signalized Intersection Capacity Analysis

## 20: McConnell St & 4th St

3/11/2015



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻			↻						↻↻	
Volume (vph)	0	18	8	88	0	0	0	0	0	62	529	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	14	14	14	12	12	12	14	14	14
Grade (%)		1%			-1%			0%			1%	
Total Lost time (s)		4.0			5.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frt		0.96			1.00						1.00	
Flt Protected		1.00			0.95						0.99	
Satd. Flow (prot)		862			1724						1459	
Flt Permitted		1.00			0.73						0.99	
Satd. Flow (perm)		862			1334						1459	
Peak-hour factor, PHF	0.92	0.75	0.79	0.78	0.92	0.92	0.92	0.92	0.92	0.85	0.89	0.92
Adj. Flow (vph)	0	24	10	113	0	0	0	0	0	73	594	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	25	0	0	113	0	0	0	0	0	667	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	0%	0%	1%	1%	0%
Turn Type		NA		Perm	NA					Perm	NA	
Protected Phases		4			8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		18.3			18.3						121.7	
Effective Green, g (s)		19.3			18.3						122.7	
Actuated g/C Ratio		0.13			0.12						0.82	
Clearance Time (s)		5.0			5.0						5.0	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		111			163						1193	
v/s Ratio Prot		0.03										
v/s Ratio Perm					0.08						0.46	
v/c Ratio		0.23			0.69						0.56	
Uniform Delay, d1		58.7			63.2						4.6	
Progression Factor		1.00			1.00						0.78	
Incremental Delay, d2		1.0			12.0						1.7	
Delay (s)		59.7			75.2						5.3	
Level of Service		E			E						A	
Approach Delay (s)		59.7			75.2			0.0			5.3	
Approach LOS		E			E			A			A	

### Intersection Summary

HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

# HCM Signalized Intersection Capacity Analysis

## 21: McConnell St & 3rd St

3/11/2015



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	64	49	13	92	0	0	0	0	4	662	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	12	12	12	13	11	14
Grade (%)		1%			-2%			0%			-1%	
Total Lost time (s)		4.0			4.0						4.0	4.0
Lane Util. Factor		1.00			1.00						0.95	1.00
Frt		0.95			1.00						1.00	0.85
Flt Protected		1.00			0.99						1.00	1.00
Satd. Flow (prot)		1762			1857						1931	1558
Flt Permitted		1.00			0.92						1.00	1.00
Satd. Flow (perm)		1762			1857						1931	1558
Peak-hour factor, PHF	0.92	0.80	0.90	0.57	0.96	0.92	0.92	0.92	0.92	0.56	0.97	0.74
Adj. Flow (vph)	0	80	54	23	96	0	0	0	0	7	682	96
RTOR Reduction (vph)	0	41	0	0	0	0	0	0	0	0	0	25
Lane Group Flow (vph)	0	93	0	0	119	0	0	0	0	0	689	71
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		10.7			10.7						54.3	54.3
Effective Green, g (s)		11.7			11.7						55.3	55.3
Actuated g/C Ratio		0.16			0.16						0.74	0.74
Clearance Time (s)		5.0			5.0						5.0	5.0
Vehicle Extension (s)		3.0			3.0						3.0	3.0
Lane Grp Cap (vph)		275			290						1424	1149
v/s Ratio Prot		0.05										
v/s Ratio Perm					0.06						0.36	0.05
v/c Ratio		0.34			0.41						0.48	0.06
Uniform Delay, d1		28.2			28.5						4.0	2.7
Progression Factor		1.00			1.00						1.00	1.00
Incremental Delay, d2		0.7			0.9						1.2	0.1
Delay (s)		28.9			29.5						5.2	2.8
Level of Service		C			C						A	A
Approach Delay (s)		28.9			29.5			0.0			4.9	
Approach LOS		C			C			A			A	

### Intersection Summary

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group