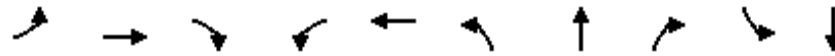


Appendix L: Recommended Scenario Analysis Output

Queues
1: S. Limestone Street & Leffel Lane



























Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	109	163	185	250	195	196	652	772	207	521
v/c Ratio	0.37	0.65	0.33	0.45	0.66	0.39	0.80	0.74	0.70	0.34
Control Delay	27.8	49.1	5.6	27.2	43.6	11.6	31.4	13.8	33.2	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	49.1	5.6	27.2	43.6	11.6	31.4	13.8	33.2	11.0
Queue Length 50th (ft)	46	87	0	54	93	48	316	199	67	58
Queue Length 95th (ft)	87	152	47	85	#188	82	#513	360	#166	81
Internal Link Dist (ft)		1055			1032		571			2708
Turn Bay Length (ft)	160			330		340			270	
Base Capacity (vph)	298	278	563	559	300	497	811	1038	294	1555
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.59	0.33	0.45	0.65	0.39	0.80	0.74	0.70	0.34

Intersection Summary

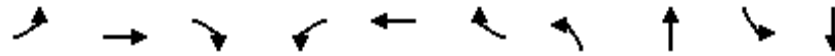
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 2010 Signalized Intersection Summary
 1: S. Limestone Street & Leffel Lane

Limestone Street Corridor Study
 Recommended Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				 							 	
Volume (veh/h)	100	150	170	230	120	60	180	600	710	190	360	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1792	1743	1743	1900	1827	1827	1827	1863	1863	1900
Adj Flow Rate, veh/h	109	163	185	250	130	65	196	652	772	207	391	130
Adj No. of Lanes	1	1	1	2	1	0	1	1	1	1	2	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
Percent Heavy Veh, %	6	6	6	9	9	9	4	4	4	2	2	2
Cap, veh/h	243	248	321	525	165	82	510	825	831	263	1184	389
Arrive On Green	0.07	0.14	0.14	0.08	0.15	0.15	0.07	0.45	0.45	0.07	0.45	0.45
Sat Flow, veh/h	1707	1792	1524	3221	1098	549	1740	1827	1553	1774	2620	861
Grp Volume(v), veh/h	109	163	185	250	0	195	196	652	772	207	263	258
Grp Sat Flow(s),veh/h/ln	1707	1792	1524	1610	0	1646	1740	1827	1553	1774	1770	1711
Q Serve(g_s), s	4.9	7.8	9.8	5.9	0.0	10.3	5.4	27.4	40.7	5.7	8.6	8.8
Cycle Q Clear(g_c), s	4.9	7.8	9.8	5.9	0.0	10.3	5.4	27.4	40.7	5.7	8.6	8.8
Prop In Lane	1.00		1.00	1.00		0.33	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	243	248	321	525	0	247	510	825	831	263	800	773
V/C Ratio(X)	0.45	0.66	0.58	0.48	0.00	0.79	0.38	0.79	0.93	0.79	0.33	0.33
Avail Cap(c_a), veh/h	263	279	347	525	0	256	510	825	831	263	800	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	30.6	36.8	31.9	30.0	0.0	36.9	12.0	21.0	19.3	19.0	15.9	15.9
Incr Delay (d2), s/veh	1.3	4.7	2.0	0.7	0.0	14.7	0.5	7.6	18.1	13.4	1.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	4.2	4.3	2.7	0.0	5.7	2.6	15.5	21.7	3.7	4.4	4.4
LnGrp Delay(d),s/veh	31.9	41.5	34.0	30.6	0.0	51.6	12.5	28.6	37.4	32.3	16.9	17.0
LnGrp LOS	C	D	C	C		D	B	C	D	C	B	B
Approach Vol, veh/h		457			445			1620			728	
Approach Delay, s/veh		36.1			39.8			30.9			21.3	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	47.6	12.0	18.4	12.0	47.6	10.9	19.5				
Change Period (Y+Rc), s	5.5	* 6.9	4.5	6.0	5.5	* 6.9	4.5	6.0				
Max Green Setting (Gmax), s	6.5	* 39	7.5	14.0	6.5	* 39	7.5	14.0				
Max Q Clear Time (g_c+I1), s	7.7	42.7	7.9	11.8	7.4	10.8	6.9	12.3				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.6	0.0	1.0	0.0	0.5				
Intersection Summary												
HCM 2010 Ctrl Delay			30.7									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Queues
2: S. Limestone Street & John Street



























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	87	174	98	174	163	65	76	761	87	641
v/c Ratio	0.29	0.68	0.27	0.57	0.44	0.12	0.17	0.68	0.34	0.39
Control Delay	25.6	50.3	2.7	32.6	36.4	2.6	5.1	10.9	12.5	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	50.3	2.7	32.6	36.4	2.6	5.1	10.9	12.5	16.8
Queue Length 50th (ft)	36	94	0	76	83	0	10	74	20	126
Queue Length 95th (ft)	71	160	8	129	143	15	m14	99	42	172
Internal Link Dist (ft)		892			573			2708		410
Turn Bay Length (ft)	100		100	75			290		200	
Base Capacity (vph)	306	294	388	306	383	563	442	1126	256	1643
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.59	0.25	0.57	0.43	0.12	0.17	0.68	0.34	0.39

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 2: S. Limestone Street & John Street

Limestone Street Corridor Study
 Recommended Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	160	90	160	150	60	70	570	130	80	520	70
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1827	1827	1827	1827	1827	1863	1863	1900	1845	1845	1900
Adj Flow Rate, veh/h	87	174	98	174	163	65	76	620	141	87	565	76
Adj No. of Lanes	1	1	1	1	1	1	1	2	0	1	2	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
Percent Heavy Veh, %	4	4	4	4	4	4	2	2	2	3	3	3
Cap, veh/h	271	229	194	280	293	341	465	1154	262	389	1486	199
Arrive On Green	0.06	0.13	0.13	0.09	0.16	0.16	0.06	0.48	0.48	0.06	0.48	0.48
Sat Flow, veh/h	1740	1827	1553	1740	1827	1553	1774	2425	551	1757	3107	417
Grp Volume(v), veh/h	87	174	98	174	163	65	76	309	452	87	318	323
Grp Sat Flow(s),veh/h/ln	1740	1827	1553	1740	1827	1553	1774	1211	1766	1757	1752	1771
Q Serve(g_s), s	3.9	8.3	5.3	7.7	7.4	3.1	1.9	16.2	16.2	2.2	10.4	10.5
Cycle Q Clear(g_c), s	3.9	8.3	5.3	7.7	7.4	3.1	1.9	16.2	16.2	2.2	10.4	10.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.31	1.00		0.24
Lane Grp Cap(c), veh/h	271	229	194	280	293	341	465	576	840	389	838	847
V/C Ratio(X)	0.32	0.76	0.50	0.62	0.56	0.19	0.16	0.54	0.54	0.22	0.38	0.38
Avail Cap(c_a), veh/h	294	294	250	280	363	401	490	576	840	410	838	847
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.59	0.59	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	38.1	36.8	30.4	34.8	28.6	10.9	16.6	16.6	11.9	15.0	15.0
Incr Delay (d2), s/veh	0.7	8.4	2.0	4.2	1.6	0.3	0.1	2.1	1.5	0.3	1.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.7	2.4	4.0	3.8	1.3	0.9	5.7	8.2	1.1	5.3	5.4
LnGrp Delay(d),s/veh	32.3	46.4	38.8	34.6	36.5	28.9	11.0	18.7	18.1	12.2	16.3	16.3
LnGrp LOS	C	D	D	C	D	C	B	B	B	B	B	B
Approach Vol, veh/h		359			402			837			728	
Approach Delay, s/veh		40.9			34.4			17.7			15.8	
Approach LOS		D			C			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.9	49.3	13.0	16.8	10.7	49.5	9.8	19.9				
Change Period (Y+Rc), s	5.6	* 6.5	4.5	* 5.5	5.6	* 6.5	4.5	* 5.5				
Max Green Setting (Gmax), s	6.4	* 39	8.5	* 15	6.4	* 39	6.5	* 18				
Max Q Clear Time (g_c+I1), s	4.2	18.2	9.7	10.3	3.9	12.5	5.9	9.4				
Green Ext Time (p_c), s	0.0	8.9	0.0	1.0	0.0	9.9	0.0	1.6				
Intersection Summary												
HCM 2010 Ctrl Delay			23.6									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
3: Limestone Street & Clark Street/Selma Road

Limestone Street Corridor Study
Recommended Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	20	20	60	10	460	20	630	50	360	620	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.946				0.850		0.989			0.998	
Flt Protected		0.990			0.959		0.950			0.950		
Satd. Flow (prot)	0	1745	0	0	1786	1583	1770	3500	0	1770	1859	0
Flt Permitted		0.924			0.814		0.405			0.287		
Satd. Flow (perm)	0	1628	0	0	1516	1583	754	3500	0	535	1859	0
Satd. Flow (RTOR)		22				127		10			1	
Adj. Flow (vph)	11	22	22	65	11	500	22	685	54	391	674	11
Lane Group Flow (vph)	0	55	0	0	76	500	22	739	0	391	685	0
Turn Type	Perm	NA		Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	26.0	26.0		26.0	26.0	27.0	12.0	47.0		27.0	62.0	
Total Lost Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Act Effect Green (s)		11.1			11.1	36.5	60.5	53.5		81.3	77.5	
Actuated g/C Ratio		0.11			0.11	0.36	0.60	0.54		0.81	0.78	
v/c Ratio		0.28			0.45	0.76	0.04	0.39		0.55	0.48	
Control Delay		29.9			49.3	27.1	6.0	16.2		19.4	11.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.3	0.5	
Total Delay		29.9			49.3	27.1	6.0	16.2		19.7	12.0	
LOS		C			D	C	A	B		B	B	
Approach Delay		29.9			30.0			15.9			14.8	
Approach LOS		C			C			B			B	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 11 (11%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 19.0
 Intersection LOS: B
 Intersection Capacity Utilization 65.8%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Limestone Street & Clark Street/Selma Road



Queues
3: Limestone Street & Clark Street/Selma Road






















Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	76	500	22	739	391	685
v/c Ratio	0.28	0.45	0.76	0.04	0.39	0.55	0.48
Control Delay	29.9	49.3	27.1	6.0	16.2	19.4	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.3	0.5
Total Delay	29.9	49.3	27.1	6.0	16.2	19.7	12.0
Queue Length 50th (ft)	20	46	203	2	142	140	121
Queue Length 95th (ft)	54	88	274	9	229	233	282
Internal Link Dist (ft)	406	396			1987		380
Turn Bay Length (ft)				100		100	
Base Capacity (vph)	359	318	674	527	1878	730	1441
Starvation Cap Reductn	0	0	0	0	0	64	338
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.24	0.74	0.04	0.39	0.59	0.62

Intersection Summary

HCM 2010 Signalized Intersection Summary
 3: Limestone Street & Clark Street/Selma Road

Limestone Street Corridor Study
 Recommended Scenario

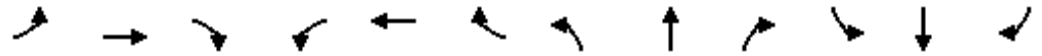
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	20	20	60	10	460	20	630	50	360	620	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	11	22	22	65	11	500	22	685	54	391	674	11
Adj No. of Lanes	0	1	0	0	1	1	1	2	0	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	83	155	130	324	50	531	414	1711	135	573	1111	18
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.03	0.51	0.51	0.13	0.61	0.61
Sat Flow, veh/h	189	738	618	1223	237	1583	1774	3324	262	1774	1828	30
Grp Volume(v), veh/h	55	0	0	76	0	500	22	364	375	391	0	685
Grp Sat Flow(s),veh/h/ln	1545	0	0	1459	0	1583	1774	1770	1817	1774	0	1857
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	21.0	0.6	12.6	12.6	9.6	0.0	22.9
Cycle Q Clear(g_c), s	2.6	0.0	0.0	3.8	0.0	21.0	0.6	12.6	12.6	9.6	0.0	22.9
Prop In Lane	0.20		0.40	0.86		1.00	1.00		0.14	1.00		0.02
Lane Grp Cap(c), veh/h	368	0	0	373	0	531	414	911	935	573	0	1129
V/C Ratio(X)	0.15	0.00	0.00	0.20	0.00	0.94	0.05	0.40	0.40	0.68	0.00	0.61
Avail Cap(c_a), veh/h	368	0	0	373	0	531	482	911	935	741	0	1129
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.77	0.00	0.77
Uniform Delay (d), s/veh	32.2	0.0	0.0	32.6	0.0	32.3	11.3	14.8	14.8	9.8	0.0	12.2
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.0	25.4	0.1	1.3	1.3	1.3	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	1.8	0.0	17.1	0.3	6.4	6.6	4.8	0.0	12.2
LnGrp Delay(d),s/veh	32.4	0.0	0.0	32.9	0.0	57.7	11.4	16.1	16.1	11.1	0.0	14.0
LnGrp LOS	C			C		E	B	B	B	B		B
Approach Vol, veh/h		55			576			761			1076	
Approach Delay, s/veh		32.4			54.4			16.0			13.0	
Approach LOS		C			D			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	17.5	56.5		26.0	8.2	65.8		26.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	22.0	42.0		21.0	7.0	57.0		21.0				
Max Q Clear Time (g_c+I1), s	11.6	14.6		4.6	2.6	24.9		23.0				
Green Ext Time (p_c), s	0.9	10.8		2.6	0.0	11.5		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			24.0									
HCM 2010 LOS			C									

Lanes, Volumes, Timings

Limestone Street Corridor Study

14: Limestone Street/S. Limestone Street & Pleasant Street/Spring Street

Recommended Scenario

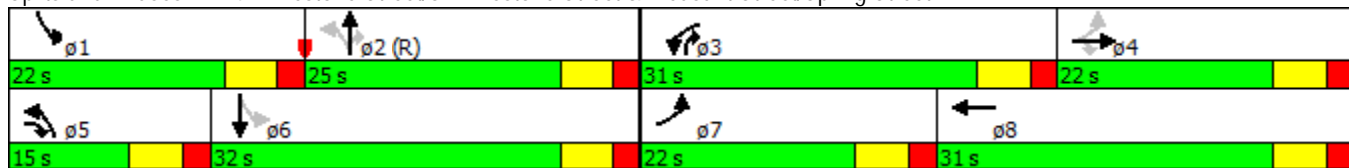


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	100	210	670	160	20	130	250	720	10	110	10
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.983				0.850		0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	1831	0	1770	1863	1583	1770	1839	0
Flt Permitted	0.634			0.950			0.523			0.592		
Satd. Flow (perm)	1181	1863	1583	3433	1831	0	974	1863	1583	1103	1839	0
Satd. Flow (RTOR)			229		6				681		4	
Adj. Flow (vph)	11	109	228	728	174	22	141	272	783	11	120	11
Lane Group Flow (vph)	11	109	228	728	196	0	141	272	783	11	131	0
Turn Type	pm+pt	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4				2		2	6		
Total Split (s)	22.0	22.0	15.0	31.0	31.0		15.0	25.0	31.0	22.0	32.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Act Effect Green (s)	19.8	15.2	26.2	29.4	44.4		40.2	38.4	75.0	33.4	26.4	
Actuated g/C Ratio	0.20	0.15	0.26	0.29	0.44		0.40	0.38	0.75	0.33	0.26	
v/c Ratio	0.04	0.39	0.39	0.72	0.24		0.31	0.38	0.58	0.03	0.27	
Control Delay	17.5	42.2	5.6	38.4	19.0		25.3	29.7	3.8	18.1	30.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	17.5	42.2	5.6	38.4	19.0		25.3	29.7	3.9	18.1	30.3	
LOS	B	D	A	D	B		C	C	A	B	C	
Approach Delay		17.4			34.3			12.3			29.3	
Approach LOS		B			C			B			C	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 21.7
 Intersection LOS: C
 Intersection Capacity Utilization 75.4%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 14: Limestone Street/S. Limestone Street & Pleasant Street/Spring Street

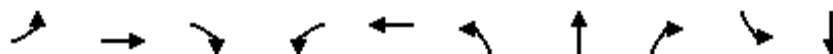


Queues

Limestone Street Corridor Study

14: Limestone Street/S. Limestone Street & Pleasant Street/Spring Street

Recommended Scenario


























Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	109	228	728	196	141	272	783	11	131
v/c Ratio	0.04	0.39	0.39	0.72	0.24	0.31	0.38	0.58	0.03	0.27
Control Delay	17.5	42.2	5.6	38.4	19.0	25.3	29.7	3.8	18.1	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	42.2	5.6	38.4	19.0	25.3	29.7	3.9	18.1	30.3
Queue Length 50th (ft)	4	63	0	228	69	50	107	50	4	64
Queue Length 95th (ft)	13	115	52	#320	147	m112	m252	84	15	116
Internal Link Dist (ft)		434			542		380			488
Turn Bay Length (ft)			200			100				
Base Capacity (vph)	434	298	588	1009	816	462	715	1357	558	488
Starvation Cap Reductn	0	0	0	0	0	0	0	29	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.37	0.39	0.72	0.24	0.31	0.38	0.59	0.02	0.27

Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	100	210	670	160	20	130	250	720	10	110	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	11	109	228	728	174	22	141	272	783	11	120	11
Adj No. of Lanes	1	1	1	2	1	0	1	1	1	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	283	357	804	512	65	512	567	852	295	506	46
Arrive On Green	0.07	0.15	0.15	0.23	0.32	0.32	0.07	0.30	0.30	0.07	0.30	0.30
Sat Flow, veh/h	1774	1863	1583	3442	1622	205	1774	1863	1583	1774	1681	154
Grp Volume(v), veh/h	11	109	228	728	0	196	141	272	783	11	0	131
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	0	1827	1774	1863	1583	1774	0	1836
Q Serve(g_s), s	0.5	5.3	13.0	20.6	0.0	8.2	5.4	11.9	30.4	0.4	0.0	5.4
Cycle Q Clear(g_c), s	0.5	5.3	13.0	20.6	0.0	8.2	5.4	11.9	30.4	0.4	0.0	5.4
Prop In Lane	1.00		1.00	1.00		0.11	1.00		1.00	1.00		0.08
Lane Grp Cap(c), veh/h	376	283	357	804	0	577	512	567	852	295	0	553
V/C Ratio(X)	0.03	0.38	0.64	0.91	0.00	0.34	0.28	0.48	0.92	0.04	0.00	0.24
Avail Cap(c_a), veh/h	536	298	369	860	0	577	542	567	852	455	0	553
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.82	0.82	0.82	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.4	38.2	35.1	37.2	0.0	26.2	21.4	28.3	21.1	20.6	0.0	26.3
Incr Delay (d2), s/veh	0.0	0.9	3.5	12.5	0.0	1.6	0.2	2.4	14.3	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.8	6.0	11.2	0.0	4.4	2.7	6.5	23.0	0.2	0.0	2.8
LnGrp Delay(d),s/veh	30.5	39.0	38.6	49.8	0.0	27.8	21.7	30.7	35.4	20.6	0.0	26.5
LnGrp LOS	C	D	D	D		C	C	C	D	C		C
Approach Vol, veh/h		348			924			1196				142
Approach Delay, s/veh		38.5			45.1			32.7				26.1
Approach LOS		D			D			C				C
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	36.4	29.4	21.2	13.3	36.1	13.0	37.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	19.0	25.0	16.0	9.0	26.0	16.0	25.0				
Max Q Clear Time (g_c+I1), s	2.4	32.4	22.6	15.0	7.4	7.4	2.5	10.2				
Green Ext Time (p_c), s	0.0	0.0	0.8	0.2	0.1	5.7	0.0	2.3				
Intersection Summary												
HCM 2010 Ctrl Delay			37.5									
HCM 2010 LOS			D									

Lanes, Volumes, Timings
15: S. Limestone Street



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↗		↑
Volume (vph)	0	0	660	50	0	670
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			
Flt Protected						
Satd. Flow (prot)	0	0	1863	1583	0	1863
Flt Permitted						
Satd. Flow (perm)	0	0	1863	1583	0	1863
Adj. Flow (vph)	0	0	717	54	0	728
Lane Group Flow (vph)	0	0	717	54	0	728
Sign Control	Stop		Free		Free	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 38.6% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
 17: S. Limestone Street & Grand Avenue

Limestone Street Corridor Study
 Recommended Scenario



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	10	20	20	30	10	20	20	660	30	10	650	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.946			0.955			0.994			0.998	
Flt Protected		0.990			0.976			0.999			0.999	
Satd. Flow (prot)	0	1654	0	0	1630	0	0	1848	0	0	1857	0
Flt Permitted		0.990			0.976			0.999			0.999	
Satd. Flow (perm)	0	1654	0	0	1630	0	0	1848	0	0	1857	0
Adj. Flow (vph)	11	22	22	33	11	22	22	717	33	11	707	11
Lane Group Flow (vph)	0	55	0	0	66	0	0	772	0	0	729	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Control Type: Roundabout	
Intersection Capacity Utilization 61.9%	ICU Level of Service B
Analysis Period (min) 15	

Lanes, Volumes, Timings
1: S. Limestone Street & Leffel Lane

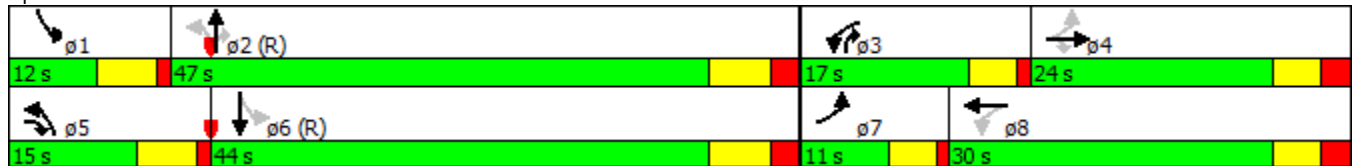
Limestone Street Corridor Study
Recommended Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	150	220	580	200	180	180	590	370	120	730	120
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850		0.929				0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	3467	1748	0	1752	1845	1568	1752	3431	0
Flt Permitted	0.231			0.452			0.168			0.165		
Satd. Flow (perm)	426	1845	1568	1650	1748	0	310	1845	1568	304	3431	0
Satd. Flow (RTOR)			141		43				328		21	
Adj. Flow (vph)	163	163	239	630	217	196	196	641	402	130	793	130
Lane Group Flow (vph)	163	163	239	630	413	0	196	641	402	130	923	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Total Split (s)	11.0	24.0	15.0	17.0	30.0		15.0	47.0	17.0	12.0	44.0	
Total Lost Time (s)	4.5	6.0	5.5	4.5	6.0		5.5	6.9	4.5	5.5	6.9	
Act Effect Green (s)	25.3	17.3	32.5	35.8	23.3		51.4	40.8	60.2	46.0	38.1	
Actuated g/C Ratio	0.25	0.17	0.32	0.36	0.23		0.51	0.41	0.60	0.46	0.38	
v/c Ratio	0.84	0.51	0.40	0.77	0.94		0.67	0.85	0.37	0.56	0.70	
Control Delay	61.9	43.5	12.6	32.8	64.5		24.7	40.1	3.1	22.5	19.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	61.9	43.5	12.6	32.8	64.5		24.7	40.1	3.1	22.5	19.8	
LOS	E	D	B	C	E		C	D	A	C	B	
Approach Delay		35.7			45.3			25.7			20.1	
Approach LOS		D			D			C			C	

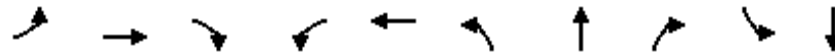
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 46 (46%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 30.9
 Intersection LOS: C
 Intersection Capacity Utilization 86.6%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: S. Limestone Street & Leffel Lane



Queues
1: S. Limestone Street & Leffel Lane



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	163	163	239	630	413	196	641	402	130	923
v/c Ratio	0.84	0.51	0.40	0.77	0.94	0.67	0.85	0.37	0.56	0.70
Control Delay	61.9	43.5	12.6	32.8	64.5	24.7	40.1	3.1	22.5	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.9	43.5	12.6	32.8	64.5	24.7	40.1	3.1	22.5	19.8
Queue Length 50th (ft)	72	94	44	158	233	62	367	19	23	239
Queue Length 95th (ft)	#157	160	108	210	#416	#110	#576	59	m64	224
Internal Link Dist (ft)		1055			1032		571			2708
Turn Bay Length (ft)	160			330		340			270	
Base Capacity (vph)	193	332	609	818	452	297	751	1073	233	1319
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.49	0.39	0.77	0.91	0.66	0.85	0.37	0.56	0.70

Intersection Summary
























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

Queue shown is maximum after two cycles.

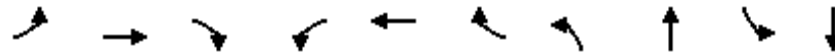
m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 1: S. Limestone Street & Leffel Lane

Limestone Street Corridor Study
 Recommended Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	150	150	220	580	200	180	180	590	370	120	730	120
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1881	1881	1900	1845	1845	1845	1845	1845	1900
Adj Flow Rate, veh/h	163	163	239	630	217	196	196	641	402	130	793	130
Adj No. of Lanes	1	1	1	2	1	0	1	1	1	1	2	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
Percent Heavy Veh, %	3	3	3	1	1	1	3	3	3	3	3	3
Cap, veh/h	189	332	419	771	219	198	319	744	828	228	1143	187
Arrive On Green	0.06	0.18	0.18	0.13	0.24	0.24	0.09	0.40	0.40	0.06	0.38	0.38
Sat Flow, veh/h	1757	1845	1568	3476	912	824	1757	1845	1568	1757	3016	494
Grp Volume(v), veh/h	163	163	239	630	0	413	196	641	402	130	461	462
Grp Sat Flow(s),veh/h/ln	1757	1845	1568	1738	0	1736	1757	1845	1568	1757	1752	1757
Q Serve(g_s), s	6.5	7.9	13.2	12.5	0.0	23.7	6.7	31.8	16.3	4.5	22.2	22.2
Cycle Q Clear(g_c), s	6.5	7.9	13.2	12.5	0.0	23.7	6.7	31.8	16.3	4.5	22.2	22.2
Prop In Lane	1.00		1.00	1.00		0.47	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	189	332	419	771	0	417	319	744	828	228	664	666
V/C Ratio(X)	0.86	0.49	0.57	0.82	0.00	0.99	0.61	0.86	0.49	0.57	0.69	0.69
Avail Cap(c_a), veh/h	189	332	419	771	0	417	333	744	828	232	664	666
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79
Uniform Delay (d), s/veh	35.1	36.9	31.7	30.4	0.0	37.9	19.7	27.3	15.0	22.5	26.2	26.2
Incr Delay (d2), s/veh	31.3	1.1	1.8	6.9	0.0	41.7	3.1	12.6	2.0	2.5	4.7	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	4.1	5.9	3.4	0.0	16.2	3.5	18.6	7.4	2.3	11.6	11.6
LnGrp Delay(d),s/veh	66.5	38.0	33.5	37.2	0.0	79.6	22.8	39.9	17.0	25.1	30.9	30.8
LnGrp LOS	E	D	C	D		E	C	D	B	C	C	C
Approach Vol, veh/h		565			1043			1239			1053	
Approach Delay, s/veh		44.3			54.0			29.8			30.1	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.8	47.2	17.0	24.0	14.2	44.8	11.0	30.0				
Change Period (Y+Rc), s	5.5	* 6.9	4.5	6.0	5.5	* 6.9	4.5	6.0				
Max Green Setting (Gmax), s	6.5	* 40	12.5	18.0	9.5	* 37	6.5	24.0				
Max Q Clear Time (g_c+I1), s	6.5	33.8	14.5	15.2	8.7	24.2	8.5	25.7				
Green Ext Time (p_c), s	0.0	1.3	0.0	1.2	0.0	1.4	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			38.5									
HCM 2010 LOS			D									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Queues
2: S. Limestone Street & John Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	109	207	141	228	217	120	174	913	109	902
v/c Ratio	0.41	0.80	0.25	0.73	0.58	0.20	0.50	0.82	0.57	0.59
Control Delay	31.5	64.9	6.0	42.8	42.7	3.3	12.3	20.7	26.9	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	64.9	6.0	42.8	42.7	3.3	12.3	20.7	26.9	24.1
Queue Length 50th (ft)	50	128	2	113	125	0	39	196	29	226
Queue Length 95th (ft)	93	#237	44	#197	200	26	m50	m348	#82	305
Internal Link Dist (ft)		892			573			2708		410
Turn Bay Length (ft)	100		100	75			290		200	
Base Capacity (vph)	263	272	599	314	393	591	395	1120	191	1517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.76	0.24	0.73	0.55	0.20	0.44	0.82	0.57	0.59

Intersection Summary

























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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
2: S. Limestone Street & John Street

Limestone Street Corridor Study
Recommended Scenario

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	100	190	130	210	200	110	160	730	110	100	740	90
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1881	1881	1881	1881	1881	1881	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	109	207	141	228	217	120	174	793	120	109	804	98
Adj No. of Lanes	1	1	1	1	1	1	1	2	0	1	2	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
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	269	251	329	306	345	385	373	1247	189	326	1471	179
Arrive On Green	0.06	0.13	0.13	0.12	0.18	0.18	0.07	0.47	0.47	0.06	0.46	0.46
Sat Flow, veh/h	1792	1881	1599	1792	1881	1599	1792	2635	399	1792	3208	391
Grp Volume(v), veh/h	109	207	141	228	217	120	174	368	545	109	448	454
Grp Sat Flow(s),veh/h/ln	1792	1881	1599	1792	1881	1599	1792	1223	1811	1792	1787	1812
Q Serve(g_s), s	5.2	10.7	7.7	10.7	10.6	6.2	5.1	22.7	22.7	3.1	18.1	18.1
Cycle Q Clear(g_c), s	5.2	10.7	7.7	10.7	10.6	6.2	5.1	22.7	22.7	3.1	18.1	18.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22	1.00		0.22
Lane Grp Cap(c), veh/h	269	251	329	306	345	385	373	579	857	326	819	831
V/C Ratio(X)	0.40	0.82	0.43	0.75	0.63	0.31	0.47	0.64	0.64	0.33	0.55	0.55
Avail Cap(c_a), veh/h	269	273	347	306	393	425	466	579	857	338	819	831
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.41	0.41	0.41	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	42.2	34.6	31.7	37.7	31.2	14.5	19.8	19.8	15.2	19.6	19.6
Incr Delay (d2), s/veh	1.0	17.1	0.9	9.6	2.6	0.5	0.4	2.2	1.5	0.6	2.6	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	6.8	3.5	6.0	5.8	2.8	2.5	7.9	11.6	1.6	9.4	9.6
LnGrp Delay(d),s/veh	35.3	59.3	35.5	41.3	40.2	31.6	14.9	22.0	21.3	15.8	22.2	22.1
LnGrp LOS	D	E	D	D	D	C	B	C	C	B	C	C
Approach Vol, veh/h		457			565			1087			1011	
Approach Delay, s/veh		46.2			38.8			20.5			21.5	
Approach LOS		D			D			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.3	53.8	16.0	18.9	12.8	52.3	11.0	23.9				
Change Period (Y+Rc), s	5.6	* 6.5	4.5	* 5.5	5.6	* 6.5	4.5	* 5.5				
Max Green Setting (Gmax), s	6.4	* 46	11.5	* 15	12.4	* 40	6.5	* 21				
Max Q Clear Time (g_c+I1), s	5.1	24.7	12.7	12.7	7.1	20.1	7.2	12.6				
Green Ext Time (p_c), s	0.0	12.0	0.0	0.7	0.2	11.5	0.0	2.2				
Intersection Summary												
HCM 2010 Ctrl Delay			27.9									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
 3: Limestone Street & Clark Street/Selma Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	30	70	20	470	20	760	40	530	750	20
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.919				0.850		0.993				0.996
Flt Protected		0.990			0.963		0.950			0.950		
Satd. Flow (prot)	0	1729	0	0	1830	1615	1787	3549	0	1787	1874	0
Flt Permitted		0.929			0.780		0.351			0.229		
Satd. Flow (perm)	0	1622	0	0	1482	1615	660	3549	0	431	1874	0
Satd. Flow (RTOR)		33				87		5			2	
Adj. Flow (vph)	11	11	33	76	22	511	22	826	43	576	815	22
Lane Group Flow (vph)	0	55	0	0	98	511	22	869	0	576	837	0
Turn Type	Perm	NA		Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	26.0	26.0		26.0	26.0	37.0	12.0	57.0		37.0	82.0	
Total Lost Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Act Effct Green (s)		13.3			13.3	48.5	68.5	61.5		96.7	89.5	
Actuated g/C Ratio		0.11			0.11	0.40	0.57	0.51		0.81	0.75	
v/c Ratio		0.26			0.60	0.73	0.05	0.48		0.84	0.60	
Control Delay		26.4			64.9	30.0	7.8	21.6		35.3	12.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0		2.6	0.7	
Total Delay		26.4			64.9	30.0	7.8	21.6		37.9	12.7	
LOS		C			E	C	A	C		D	B	
Approach Delay		26.4			35.6			21.2			23.0	
Approach LOS		C			D			C			C	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 15 (13%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 25.1
 Intersection LOS: C
 Intersection Capacity Utilization 75.7%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 3: Limestone Street & Clark Street/Selma Road



Queues
3: Limestone Street & Clark Street/Selma Road






















Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	98	511	22	869	576	837
v/c Ratio	0.26	0.60	0.73	0.05	0.48	0.84	0.60
Control Delay	26.4	64.9	30.0	7.8	21.6	35.3	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.6	0.7
Total Delay	26.4	64.9	30.0	7.8	21.6	37.9	12.7
Queue Length 50th (ft)	16	73	264	4	231	313	216
Queue Length 95th (ft)	53	125	354	11	323	m418	345
Internal Link Dist (ft)	406	396			1987		380
Turn Bay Length (ft)				100		100	
Base Capacity (vph)	311	259	749	442	1822	728	1398
Starvation Cap Reductn	0	0	0	0	0	71	245
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.38	0.68	0.05	0.48	0.88	0.73

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM 2010 Signalized Intersection Summary
 3: Limestone Street & Clark Street/Selma Road

Limestone Street Corridor Study
 Recommended Scenario

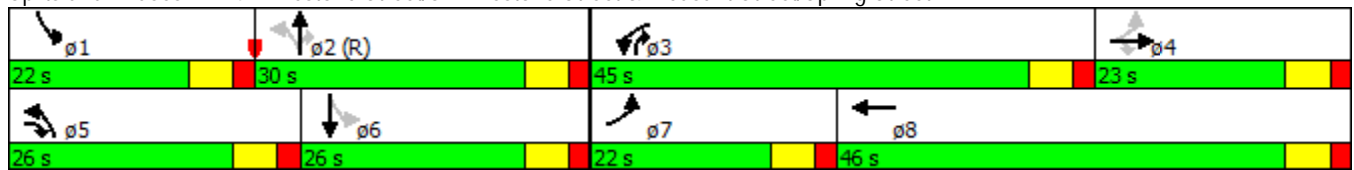
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	30	70	20	470	20	760	40	530	750	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1881	1881	1900	1881	1881	1900
Adj Flow Rate, veh/h	11	11	33	76	22	511	22	826	43	576	815	22
Adj No. of Lanes	0	1	0	0	1	1	1	2	0	1	1	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
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	69	74	160	254	67	563	380	1820	95	613	1221	33
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.03	0.53	0.53	0.17	0.67	0.67
Sat Flow, veh/h	187	423	915	1147	384	1615	1792	3457	180	1792	1823	49
Grp Volume(v), veh/h	55	0	0	98	0	511	22	427	442	576	0	837
Grp Sat Flow(s),veh/h/ln	1525	0	0	1531	0	1615	1792	1787	1849	1792	0	1873
Q Serve(g_s), s	0.0	0.0	0.0	2.9	0.0	21.0	0.7	17.8	17.8	17.2	0.0	32.0
Cycle Q Clear(g_c), s	3.3	0.0	0.0	6.2	0.0	21.0	0.7	17.8	17.8	17.2	0.0	32.0
Prop In Lane	0.20		0.60	0.78		1.00	1.00		0.10	1.00		0.03
Lane Grp Cap(c), veh/h	303	0	0	321	0	563	380	941	974	613	0	1254
V/C Ratio(X)	0.18	0.00	0.00	0.31	0.00	0.91	0.06	0.45	0.45	0.94	0.00	0.67
Avail Cap(c_a), veh/h	303	0	0	321	0	563	430	941	974	780	0	1254
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	0.59	0.00	0.59
Uniform Delay (d), s/veh	42.2	0.0	0.0	43.2	0.0	37.3	12.9	17.7	17.7	16.2	0.0	11.8
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.5	0.0	18.6	0.1	1.6	1.5	11.3	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0	2.9	0.0	19.0	0.3	9.2	9.5	20.3	0.0	16.9
LnGrp Delay(d),s/veh	42.5	0.0	0.0	43.8	0.0	55.9	12.9	19.2	19.2	27.5	0.0	13.5
LnGrp LOS	D			D		E	B	B	B	C		B
Approach Vol, veh/h		55			609			891			1413	
Approach Delay, s/veh		42.5			54.0			19.1			19.2	
Approach LOS		D			D			B			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	25.8	68.2		26.0	8.6	85.4		26.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	32.0	52.0		21.0	7.0	77.0		21.0				
Max Q Clear Time (g_c+I1), s	19.2	19.8		5.3	2.7	34.0		23.0				
Green Ext Time (p_c), s	1.6	15.1		2.7	0.0	16.9		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			26.7									
HCM 2010 LOS			C									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	130	290	850	130	10	200	240	800	20	160	30
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989				0.850		0.976	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	3433	1842	0	1770	1863	1583	1770	1818	0
Flt Permitted	0.660			0.950			0.308			0.598		
Satd. Flow (perm)	1229	1863	1583	3433	1842	0	574	1863	1583	1114	1818	0
Satd. Flow (RTOR)			136		4				624		7	
Adj. Flow (vph)	11	141	315	924	141	11	217	261	870	22	174	33
Lane Group Flow (vph)	11	141	315	924	152	0	217	261	870	22	207	0
Turn Type	pm+pt	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4				2		2	6		
Total Split (s)	22.0	23.0	26.0	45.0	46.0		26.0	30.0	45.0	22.0	26.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Act Effect Green (s)	25.4	18.4	40.0	37.6	59.4		46.0	38.0	81.6	31.6	24.4	
Actuated g/C Ratio	0.21	0.15	0.33	0.31	0.50		0.38	0.32	0.68	0.26	0.20	
v/c Ratio	0.04	0.49	0.51	0.86	0.17		0.58	0.44	0.68	0.07	0.55	
Control Delay	20.6	53.9	20.6	47.9	17.9		40.2	46.0	7.2	24.9	49.0	
Queue Delay	0.0	0.0	0.3	0.0	0.0		0.0	0.0	0.1	0.0	0.1	
Total Delay	20.6	53.9	20.9	47.9	17.9		40.2	46.0	7.2	24.9	49.1	
LOS	C	D	C	D	B		D	D	A	C	D	
Approach Delay		30.8			43.7			20.0			46.8	
Approach LOS		C			D			C			D	

Intersection Summary

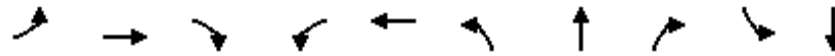
Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 31.8
 Intersection LOS: C
 Intersection Capacity Utilization 80.4%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 14: Limestone Street/S. Limestone Street & Pleasant Street/Spring Street



Queues

14: Limestone Street/S. Limestone Street & Pleasant Street/Spring Street



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	141	315	924	152	217	261	870	22	207
v/c Ratio	0.04	0.49	0.51	0.86	0.17	0.58	0.44	0.68	0.07	0.55
Control Delay	20.6	53.9	20.6	47.9	17.9	40.2	46.0	7.2	24.9	49.0
Queue Delay	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Total Delay	20.6	53.9	20.9	47.9	17.9	40.2	46.0	7.2	24.9	49.1
Queue Length 50th (ft)	4	103	110	339	58	132	176	106	11	140
Queue Length 95th (ft)	14	171	190	422	121	228	294	146	28	232
Internal Link Dist (ft)		434			542		380			488
Turn Bay Length (ft)			200			100				
Base Capacity (vph)	425	285	671	1115	913	419	590	1287	462	375
Starvation Cap Reductn	0	0	0	0	0	0	0	23	0	0
Spillback Cap Reductn	0	0	77	0	0	0	0	0	0	9
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.49	0.53	0.83	0.17	0.52	0.44	0.69	0.05	0.57

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	130	290	850	130	10	200	240	800	20	160	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1900	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	11	141	315	924	141	11	217	261	870	22	174	33
Adj No. of Lanes	1	1	1	2	1	0	1	1	1	1	1	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	338	264	392	1010	643	50	439	571	950	259	394	75
Arrive On Green	0.06	0.14	0.14	0.29	0.38	0.38	0.11	0.31	0.31	0.06	0.26	0.26
Sat Flow, veh/h	1774	1863	1583	3442	1706	133	1774	1863	1583	1774	1523	289
Grp Volume(v), veh/h	11	141	315	924	0	152	217	261	870	22	0	207
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	0	1839	1774	1863	1583	1774	0	1812
Q Serve(g_s), s	0.6	8.4	17.0	31.1	0.0	6.7	10.4	13.6	36.8	1.0	0.0	11.5
Cycle Q Clear(g_c), s	0.6	8.4	17.0	31.1	0.0	6.7	10.4	13.6	36.8	1.0	0.0	11.5
Prop In Lane	1.00		1.00	1.00		0.07	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	338	264	392	1010	0	693	439	571	950	259	0	469
V/C Ratio(X)	0.03	0.53	0.80	0.92	0.00	0.22	0.49	0.46	0.92	0.08	0.00	0.44
Avail Cap(c_a), veh/h	471	264	392	1119	0	693	547	571	950	393	0	469
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.80	0.80	0.80	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.6	47.8	42.4	41.0	0.0	25.4	27.2	33.5	21.3	28.6	0.0	37.2
Incr Delay (d2), s/veh	0.0	2.1	11.5	10.9	0.0	0.7	0.7	2.1	12.4	0.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	4.5	11.1	16.3	0.0	3.6	5.1	7.3	28.6	0.5	0.0	5.8
LnGrp Delay(d),s/veh	38.7	49.9	53.9	51.8	0.0	26.1	27.9	35.6	33.7	28.7	0.0	37.9
LnGrp LOS	D	D	D	D		C	C	D	C	C		D
Approach Vol, veh/h		467			1076			1348			229	
Approach Delay, s/veh		52.3			48.2			33.2			37.0	
Approach LOS		D			D			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	42.8	41.2	23.0	18.7	37.1	13.0	51.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	16.0	24.0	39.0	17.0	20.0	20.0	16.0	40.0				
Max Q Clear Time (g_c+I1), s	3.0	38.8	33.1	19.0	12.4	13.5	2.6	8.7				
Green Ext Time (p_c), s	0.0	0.0	2.1	0.0	0.4	3.6	0.0	2.9				
Intersection Summary												
HCM 2010 Ctrl Delay			41.5									
HCM 2010 LOS			D									

Lanes, Volumes, Timings
15: S. Limestone Street



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑	↗		↑
Volume (vph)	0	0	860	80	0	930
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			
Flt Protected						
Satd. Flow (prot)	0	0	1863	1583	0	1863
Flt Permitted						
Satd. Flow (perm)	0	0	1863	1583	0	1863
Adj. Flow (vph)	0	0	935	87	0	1011
Lane Group Flow (vph)	0	0	935	87	0	1011
Sign Control	Stop		Free		Free	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 52.3% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
 17: S. Limestone Street & Grand Avenue

Limestone Street Corridor Study
 Recommended Scenario



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	10	10	30	20	20	20	20	810	30	10	830	20
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.919			0.955			0.995			0.997	
Flt Protected		0.990			0.984			0.999			0.999	
Satd. Flow (prot)	0	1607	0	0	1643	0	0	1851	0	0	1855	0
Flt Permitted		0.990			0.984			0.999			0.999	
Satd. Flow (perm)	0	1607	0	0	1643	0	0	1851	0	0	1855	0
Adj. Flow (vph)	11	11	33	22	22	22	22	880	33	11	902	22
Lane Group Flow (vph)	0	55	0	0	66	0	0	935	0	0	935	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Control Type: Roundabout
 Intersection Capacity Utilization 68.8% ICU Level of Service C
 Analysis Period (min) 15