

Appendix G: No-Build Analysis Output

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

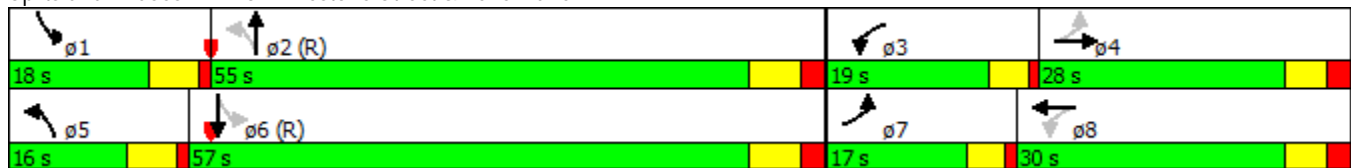
Limestone Street Corridor Study
No Build Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	150	170	230	120	60	180	600	710	190	360	120
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.920			0.950			0.919			0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	3133	0	1656	3146	0	1736	3190	0	1770	3408	0
Flt Permitted	0.629			0.253			0.458			0.067		
Satd. Flow (perm)	1127	3133	0	441	3146	0	837	3190	0	125	3408	0
Satd. Flow (RTOR)		185			64			297			46	
Adj. Flow (vph)	109	163	185	250	130	65	196	652	772	207	391	130
Lane Group Flow (vph)	109	348	0	250	195	0	196	1424	0	207	521	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	17.0	28.0		19.0	30.0		16.0	55.0		18.0	57.0	
Total Lost Time (s)	4.5	6.0		4.5	6.0		5.5	6.9		5.5	6.9	
Act Effect Green (s)	24.2	12.0		31.2	15.8		68.2	55.6		75.7	59.4	
Actuated g/C Ratio	0.20	0.10		0.26	0.13		0.57	0.46		0.63	0.50	
v/c Ratio	0.39	0.72		0.96	0.42		0.35	0.87		0.73	0.30	
Control Delay	37.6	32.9		85.0	34.3		11.5	30.6		42.1	17.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	37.6	32.9		85.0	34.3		11.5	30.6		42.1	17.9	
LOS	D	C		F	C		B	C		D	B	
Approach Delay		34.0			62.8			28.3			24.8	
Approach LOS		C			E			C			C	

Intersection Summary





















Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 99 (83%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 33.0
 Intersection LOS: C
 Intersection Capacity Utilization 91.4%
 ICU Level of Service F
 Analysis Period (min) 15

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



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

Limestone Street Corridor Study
 No Build Conditions

												
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	1900	1743	1743	1900	1827	1827	1900	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	2	0	1	2	0	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, %	6	6	6	9	9	9	4	4	4	2	2	2
Cap, veh/h	344	251	225	289	435	207	512	769	688	234	1213	398
Arrive On Green	0.07	0.15	0.15	0.12	0.20	0.20	0.08	0.44	0.44	0.10	0.46	0.46
Sat Flow, veh/h	1707	1703	1524	1660	2181	1035	1740	1736	1553	1774	2620	861
Grp Volume(v), veh/h	109	163	185	250	97	98	196	652	772	207	263	258
Grp Sat Flow(s),veh/h/ln	1707	1703	1524	1660	1656	1560	1740	1736	1553	1774	1770	1711
Q Serve(g_s), s	6.4	10.8	14.1	14.5	6.0	6.4	7.3	40.2	53.1	9.7	11.2	11.5
Cycle Q Clear(g_c), s	6.4	10.8	14.1	14.5	6.0	6.4	7.3	40.2	53.1	9.7	11.2	11.5
Prop In Lane	1.00		1.00	1.00		0.66	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	344	251	225	289	330	311	512	769	688	234	819	792
V/C Ratio(X)	0.32	0.65	0.82	0.86	0.29	0.31	0.38	0.85	1.12	0.89	0.32	0.33
Avail Cap(c_a), veh/h	404	312	279	289	331	312	528	769	688	245	819	792
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	39.3	48.2	49.6	38.2	40.8	41.0	16.0	29.8	33.4	35.8	20.3	20.4
Incr Delay (d2), s/veh	0.5	3.2	14.8	22.7	0.5	0.6	0.5	11.2	73.2	26.3	0.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	5.3	6.9	3.4	2.8	2.8	3.5	21.6	36.7	8.4	5.7	5.6
LnGrp Delay(d),s/veh	39.9	51.5	64.4	60.9	41.3	41.6	16.4	41.1	106.6	62.1	21.2	21.4
LnGrp LOS	D	D	E	E	D	D	B	D	F	E	C	C
Approach Vol, veh/h		457			445			1620			728	
Approach Delay, s/veh		53.9			52.4			69.3			32.9	
Approach LOS		D			D			E			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	17.2	60.0	19.0	23.7	14.9	62.4	12.8	29.9				
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	12.5	* 48	14.5	22.0	10.5	* 50	12.5	24.0				
Max Q Clear Time (g_c+I1), s	11.7	55.1	16.5	16.1	9.3	13.5	8.4	8.4				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.6	0.1	2.5	0.1	2.8				

Intersection Summary

HCM 2010 Ctrl Delay	56.7
HCM 2010 LOS	E

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
2: S. Limestone Street & John Street

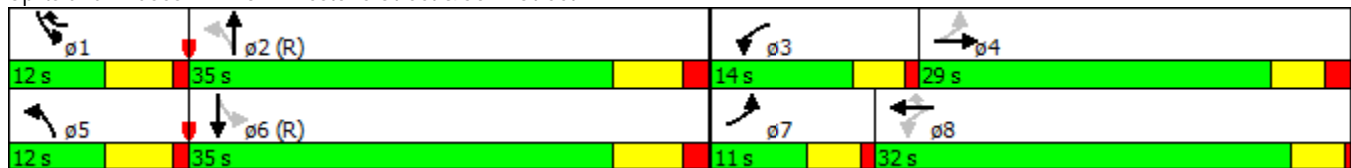
Limestone Street Corridor Study
No Build Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	160	90	160	150	60	70	570	130	80	520	70
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr _t		0.946				0.850		0.972			0.982	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1728	0	1736	1827	1553	1770	3440	0	1752	3442	0
Fl _t Permitted	0.654			0.315			0.335			0.261		
Satd. Flow (perm)	1195	1728	0	575	1827	1553	624	3440	0	481	3442	0
Satd. Flow (RTOR)		30				97		32			17	
Adj. Flow (vph)	87	174	98	174	163	65	76	620	141	87	565	76
Lane Group Flow (vph)	87	272	0	174	163	65	76	761	0	87	641	0
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	11.0	29.0		14.0	32.0	12.0	12.0	35.0		12.0	35.0	
Total Lost Time (s)	4.5	5.5		4.5	4.1	5.6	5.6	6.5		5.6	6.5	
Act Effect Green (s)	25.1	17.7		31.2	24.0	35.3	42.8	36.2		43.2	36.4	
Actuated g/C Ratio	0.28	0.20		0.35	0.27	0.39	0.48	0.40		0.48	0.40	
v/c Ratio	0.23	0.75		0.55	0.33	0.10	0.20	0.54		0.26	0.46	
Control Delay	19.7	42.7		26.2	28.4	1.8	13.7	23.5		9.7	20.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	19.7	42.7		26.2	28.4	1.8	13.7	23.5		9.7	20.9	
LOS	B	D		C	C	A	B	C		A	C	
Approach Delay		37.1			23.1			22.7			19.6	
Approach LOS		D			C			C			B	

Intersection Summary






















Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 89 (99%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 24.0
 Intersection LOS: C
 Intersection Capacity Utilization 65.8%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2: S. Limestone Street & John Street



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

Limestone Street Corridor Study
No Build Conditions

												
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	1900	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	0	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	360	212	119	296	425	453	396	1158	263	350	1262	169
Arrive On Green	0.06	0.19	0.19	0.10	0.23	0.23	0.06	0.40	0.40	0.06	0.41	0.41
Sat Flow, veh/h	1740	1099	619	1740	1827	1553	1774	2867	651	1757	3107	417
Grp Volume(v), veh/h	87	0	272	174	163	65	76	382	379	87	318	323
Grp Sat Flow(s),veh/h/ln	1740	0	1718	1740	1827	1553	1774	1770	1748	1757	1752	1771
Q Serve(g_s), s	3.5	0.0	13.7	7.0	6.8	2.8	2.2	14.8	14.8	2.5	11.8	11.9
Cycle Q Clear(g_c), s	3.5	0.0	13.7	7.0	6.8	2.8	2.2	14.8	14.8	2.5	11.8	11.9
Prop In Lane	1.00		0.36	1.00		1.00	1.00		0.37	1.00		0.24
Lane Grp Cap(c), veh/h	360	0	331	296	425	453	396	715	706	350	712	719
V/C Ratio(X)	0.24	0.00	0.82	0.59	0.38	0.14	0.19	0.53	0.54	0.25	0.45	0.45
Avail Cap(c_a), veh/h	383	0	449	308	566	573	421	715	706	371	712	719
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.44	0.44	0.44	0.97	0.97	0.97
Uniform Delay (d), s/veh	26.6	0.0	34.8	25.7	29.1	23.6	14.5	20.4	20.4	15.1	19.4	19.4
Incr Delay (d2), s/veh	0.3	0.0	8.6	2.7	0.6	0.1	0.1	1.3	1.3	0.4	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	7.3	3.6	3.5	1.2	1.1	7.5	7.4	1.2	6.1	6.2
LnGrp Delay(d),s/veh	26.9	0.0	43.4	28.4	29.7	23.7	14.6	21.7	21.7	15.4	21.4	21.4
LnGrp LOS	C		D	C	C	C	B	C	C	B	C	C
Approach Vol, veh/h		359			402			837			728	
Approach Delay, s/veh		39.4			28.2			21.0			20.6	
Approach LOS		D			C			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	10.9	42.8	13.4	22.9	10.7	43.1	9.8	26.4				
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	* 29	9.5	* 24	6.4	* 29	6.5	* 28				
Max Q Clear Time (g_c+I1), s	4.5	16.8	9.0	15.7	4.2	13.9	5.5	8.8				
Green Ext Time (p_c), s	0.0	6.4	0.0	1.7	0.0	7.4	0.0	2.6				
Intersection Summary												
HCM 2010 Ctrl Delay			25.0									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

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

Limestone Street Corridor Study
No Build Conditions



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	0.95	0.95	1.00	0.95	0.95
Frt		0.925			0.900			0.993			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1656	1612	0	1612	1527	0	1752	3480	0	1736	3464	0
Flt Permitted	0.736			0.503			0.349			0.353		
Satd. Flow (perm)	1283	1612	0	853	1527	0	644	3480	0	645	3464	0
Satd. Flow (RTOR)		22			22			6			2	
Adj. Flow (vph)	11	22	22	33	11	22	22	717	33	11	707	11
Lane Group Flow (vph)	11	44	0	33	33	0	22	750	0	11	718	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	12.0	22.0		12.0	22.0		12.0	44.0		12.0	44.0	
Total Lost Time (s)	4.5	5.8		4.5	5.8		4.5	5.9		4.5	5.9	
Act Effect Green (s)	12.0	7.7		14.4	12.5		69.2	68.9		68.1	66.7	
Actuated g/C Ratio	0.13	0.09		0.16	0.14		0.77	0.77		0.76	0.74	
v/c Ratio	0.06	0.28		0.17	0.14		0.04	0.28		0.02	0.28	
Control Delay	26.9	27.9		29.8	19.7		1.3	2.9		2.3	3.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	26.9	27.9		29.8	19.7		1.3	2.9		2.3	3.1	
LOS	C	C		C	B		A	A		A	A	
Approach Delay		27.7			24.8			2.8			3.1	
Approach LOS		C			C			A			A	

Intersection Summary





















Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 83 (92%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.28
 Intersection Signal Delay: 4.7
 Intersection LOS: A
 Intersection Capacity Utilization 37.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 3: S. Limestone Street & Grand Avenue



HCM 2010 Signalized Intersection Summary
3: S. Limestone Street & Grand Avenue

Limestone Street Corridor Study
No Build Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	20	20	30	10	20	20	660	30	10	650	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	1743	1743	1900	1696	1696	1900	1845	1845	1900	1827	1827	1900
Adj Flow Rate, veh/h	11	22	22	33	11	22	22	717	33	11	707	11
Adj No. of Lanes	1	1	0	1	1	0	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, %	9	9	9	12	12	12	3	3	3	4	4	4
Cap, veh/h	195	55	55	193	46	92	522	2209	102	493	2222	35
Arrive On Green	0.02	0.07	0.07	0.04	0.09	0.09	0.03	0.65	0.65	0.02	0.64	0.64
Sat Flow, veh/h	1660	801	801	1616	506	1012	1757	3412	157	1740	3498	54
Grp Volume(v), veh/h	11	0	44	33	0	33	22	368	382	11	351	367
Grp Sat Flow(s),veh/h/ln	1660	0	1602	1616	0	1518	1757	1752	1817	1740	1736	1817
Q Serve(g_s), s	0.5	0.0	2.4	1.7	0.0	1.8	0.4	8.4	8.4	0.2	8.3	8.3
Cycle Q Clear(g_c), s	0.5	0.0	2.4	1.7	0.0	1.8	0.4	8.4	8.4	0.2	8.3	8.3
Prop In Lane	1.00		0.50	1.00		0.67	1.00		0.09	1.00		0.03
Lane Grp Cap(c), veh/h	195	0	111	193	0	137	522	1134	1176	493	1102	1154
V/C Ratio(X)	0.06	0.00	0.40	0.17	0.00	0.24	0.04	0.32	0.32	0.02	0.32	0.32
Avail Cap(c_a), veh/h	307	0	288	268	0	273	619	1134	1176	610	1102	1154
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.87	0.87	0.87	0.76	0.76	0.76
Uniform Delay (d), s/veh	37.9	0.0	40.1	36.7	0.0	38.0	5.6	7.1	7.1	5.8	7.5	7.5
Incr Delay (d2), s/veh	0.1	0.0	2.3	0.4	0.0	0.9	0.0	0.7	0.6	0.0	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.1	0.8	0.0	0.8	0.2	4.2	4.3	0.1	4.1	4.3
LnGrp Delay(d),s/veh	38.0	0.0	42.4	37.1	0.0	38.9	5.6	7.7	7.7	5.8	8.1	8.1
LnGrp LOS	D		D	D		D	A	A	A	A	A	A
Approach Vol, veh/h		55			66			772			729	
Approach Delay, s/veh		41.5			38.0			7.7			8.0	
Approach LOS		D			D			A			A	
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	5.9	64.2	7.9	12.0	7.0	63.1	5.9	14.0				
Change Period (Y+Rc), s	4.5	* 5.9	4.5	* 5.8	4.5	* 5.9	4.5	* 5.8				
Max Green Setting (Gmax), s	7.5	* 38	7.5	* 16	7.5	* 38	7.5	* 16				
Max Q Clear Time (g_c+I1), s	2.2	10.4	3.7	4.4	2.4	10.3	2.5	3.8				
Green Ext Time (p_c), s	0.0	10.5	0.0	0.2	0.0	10.6	0.0	0.2				
Intersection Summary												
HCM 2010 Ctrl Delay			10.2									
HCM 2010 LOS			B									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
 4: S. Limestone Street & Selma Road & Spring Street

Limestone Street Corridor Study
 No Build Conditions

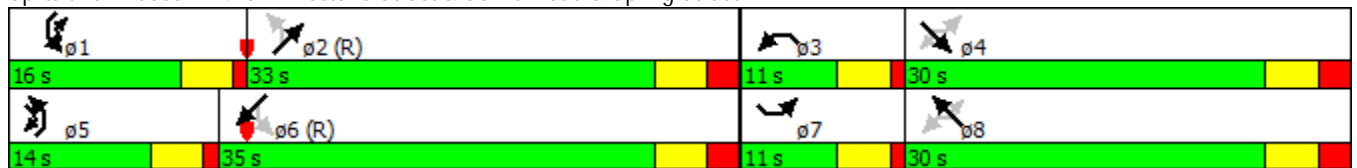


Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	250	70	60	270	190	110	530	50	110	560	180
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.987			0.963	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1845	1568	1736	1827	1553	1770	3493	0	1752	3375	0
Flt Permitted	0.403			0.494			0.198			0.295		
Satd. Flow (perm)	743	1845	1568	902	1827	1553	369	3493	0	544	3375	0
Satd. Flow (RTOR)			88			164		11			51	
Adj. Flow (vph)	120	272	76	65	293	207	120	576	54	120	609	196
Lane Group Flow (vph)	120	272	76	65	293	207	120	630	0	120	805	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8	1	5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Total Split (s)	11.0	30.0	14.0	11.0	30.0	16.0	14.0	33.0		16.0	35.0	
Total Lost Time (s)	4.5	5.9	4.5	4.5	5.9	4.5	4.5	5.8		4.5	5.8	
Act Effect Green (s)	32.9	26.3	40.6	31.9	24.1	38.9	39.5	29.9		40.5	30.3	
Actuated g/C Ratio	0.37	0.29	0.45	0.35	0.27	0.43	0.44	0.33		0.45	0.34	
v/c Ratio	0.35	0.50	0.10	0.17	0.60	0.27	0.41	0.54		0.33	0.69	
Control Delay	20.5	31.5	3.2	17.9	34.7	5.1	20.9	15.9		15.1	27.9	
Queue Delay	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	20.5	34.8	3.2	17.9	34.7	5.1	20.9	15.9		15.1	27.9	
LOS	C	C	A	B	C	A	C	B		B	C	
Approach Delay		26.0			21.9			16.7			26.2	
Approach LOS		C			C			B			C	

Intersection Summary

Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 40 (44%), Referenced to phase 2:NETL and 6:SWTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 22.6	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: S. Limestone Street & Selma Road & Spring Street



HCM 2010 Signalized Intersection Summary
 4: S. Limestone Street & Selma Road & Spring Street

Limestone Street Corridor Study
 No Build Conditions

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	110	250	70	60	270	190	110	530	50	110	560	180
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	1827	1827	1827	1863	1863	1900	1845	1845	1900
Adj Flow Rate, veh/h	120	272	76	65	293	207	120	576	54	120	609	196
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, %	3	3	3	4	4	4	2	2	2	3	3	3
Cap, veh/h	312	520	541	332	489	514	313	1215	114	377	970	312
Arrive On Green	0.07	0.28	0.28	0.05	0.27	0.27	0.06	0.37	0.37	0.06	0.37	0.37
Sat Flow, veh/h	1757	1845	1568	1740	1827	1553	1774	3272	306	1757	2610	839
Grp Volume(v), veh/h	120	272	76	65	293	207	120	311	319	120	409	396
Grp Sat Flow(s),veh/h/ln	1757	1845	1568	1740	1827	1553	1774	1770	1809	1757	1752	1697
Q Serve(g_s), s	4.4	11.2	3.0	2.4	12.6	9.3	3.7	12.1	12.1	3.7	17.2	17.3
Cycle Q Clear(g_c), s	4.4	11.2	3.0	2.4	12.6	9.3	3.7	12.1	12.1	3.7	17.2	17.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.17	1.00		0.49
Lane Grp Cap(c), veh/h	312	520	541	332	489	514	313	657	672	377	651	630
V/C Ratio(X)	0.38	0.52	0.14	0.20	0.60	0.40	0.38	0.47	0.47	0.32	0.63	0.63
Avail Cap(c_a), veh/h	320	520	541	365	489	514	388	657	672	490	651	630
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	0.97	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	27.2	20.3	22.1	28.7	23.2	17.4	21.6	21.6	16.4	23.2	23.2
Incr Delay (d2), s/veh	0.8	3.7	0.5	0.3	5.3	2.3	0.7	2.4	2.3	0.5	4.5	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	2.2	6.2	1.4	1.1	7.1	4.3	1.8	6.3	6.5	1.8	9.1	8.9
LnGrp Delay(d),s/veh	23.1	31.0	20.8	22.4	34.1	25.6	18.2	23.9	23.9	16.9	27.7	27.9
LnGrp LOS	C	C	C	C	C	C	B	C	C	B	C	C
Approach Vol, veh/h		468			565			750			925	
Approach Delay, s/veh		27.3			29.6			23.0			26.4	
Approach LOS		C			C			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	10.2	39.2	9.3	31.3	10.2	39.2	10.6	30.0				
Change Period (Y+Rc), s	4.5	* 5.8	4.5	* 5.9	4.5	* 5.8	4.5	* 5.9				
Max Green Setting (Gmax), s	11.5	* 27	6.5	* 24	9.5	* 29	6.5	* 24				
Max Q Clear Time (g_c+I1), s	5.7	14.1	4.4	13.2	5.7	19.3	6.4	14.6				
Green Ext Time (p_c), s	0.1	7.6	0.0	3.4	0.1	6.2	0.0	3.1				
Intersection Summary												
HCM 2010 Ctrl Delay			26.3									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

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

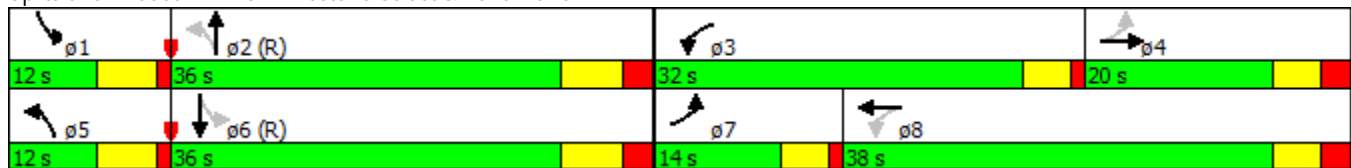
Limestone Street Corridor Study
No Build Conditions

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	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Fr _t		0.911			0.929			0.942			0.979	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3193	0	1787	3320	0	1752	3302	0	1752	3431	0
Fl _t Permitted	0.510			0.242			0.132			0.137		
Satd. Flow (perm)	941	3193	0	455	3320	0	243	3302	0	253	3431	0
Satd. Flow (RTOR)		167			196			139			19	
Adj. Flow (vph)	163	163	239	630	217	196	196	641	402	130	793	130
Lane Group Flow (vph)	163	402	0	630	413	0	196	1043	0	130	923	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	14.0	20.0		32.0	38.0		12.0	36.0		12.0	36.0	
Total Lost Time (s)	4.5	6.0		4.5	6.0		5.5	6.9		5.5	6.9	
Act Effect Green (s)	22.7	12.0		45.5	30.4		40.2	30.3		37.8	29.1	
Actuated g/C Ratio	0.23	0.12		0.46	0.30		0.40	0.30		0.38	0.29	
v/c Ratio	0.57	0.76		1.10	0.36		0.87	0.95		0.63	0.91	
Control Delay	27.3	34.2		94.2	14.5		59.7	48.5		36.1	33.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.3	34.2		94.2	14.5		59.7	48.5		36.1	33.4	
LOS	C	C		F	B		E	D		D	C	
Approach Delay		32.2			62.7			50.3			33.8	
Approach LOS		C			E			D			C	

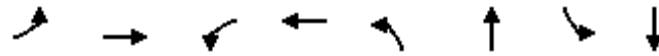
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 57 (57%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 46.5
 Intersection LOS: D
 Intersection Capacity Utilization 97.3%
 ICU Level of Service F
 Analysis Period (min) 15

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



Queues
1: S. Limestone Street & Leffel Lane























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	163	402	630	413	196	1043	130	923
v/c Ratio	0.57	0.76	1.10	0.36	0.87	0.95	0.63	0.91
Control Delay	27.3	34.2	94.2	14.5	59.7	48.5	36.1	33.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	34.2	94.2	14.5	59.7	48.5	36.1	33.4
Queue Length 50th (ft)	59	75	~396	53	78	308	37	214
Queue Length 95th (ft)	99	126	#608	92	#228	#455	m78	#198
Internal Link Dist (ft)		1055		1032		571		2708
Turn Bay Length (ft)	160		330		340		270	
Base Capacity (vph)	293	590	573	1195	225	1096	205	1011
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.68	1.10	0.35	0.87	0.95	0.63	0.91

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- 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
No Build Conditions

												
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	1900	1881	1881	1900	1845	1845	1900	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	2	0	1	2	0	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, %	3	3	3	1	1	1	3	3	3	3	3	3
Cap, veh/h	373	245	220	565	583	502	209	602	378	186	878	144
Arrive On Green	0.09	0.14	0.14	0.28	0.32	0.32	0.06	0.29	0.29	0.06	0.29	0.29
Sat Flow, veh/h	1757	1752	1568	1792	1823	1568	1757	2070	1298	1757	3016	494
Grp Volume(v), veh/h	163	163	239	630	212	201	196	543	500	130	461	462
Grp Sat Flow(s),veh/h/ln	1757	1752	1568	1792	1787	1604	1757	1752	1616	1757	1752	1757
Q Serve(g_s), s	7.8	8.8	14.0	27.5	9.2	9.7	6.5	29.1	29.1	5.1	25.3	25.3
Cycle Q Clear(g_c), s	7.8	8.8	14.0	27.5	9.2	9.7	6.5	29.1	29.1	5.1	25.3	25.3
Prop In Lane	1.00		1.00	1.00		0.98	1.00		0.80	1.00		0.28
Lane Grp Cap(c), veh/h	373	245	220	565	572	513	209	510	470	186	510	511
V/C Ratio(X)	0.44	0.66	1.09	1.12	0.37	0.39	0.94	1.06	1.06	0.70	0.90	0.90
Avail Cap(c_a), veh/h	373	245	220	565	572	513	209	510	470	186	510	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.61	0.61	0.61
Uniform Delay (d), s/veh	32.3	40.8	43.0	27.3	26.2	26.4	30.9	35.4	35.5	26.6	34.1	34.1
Incr Delay (d2), s/veh	0.8	6.6	86.4	73.7	0.4	0.5	45.1	57.9	59.7	6.8	15.0	15.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	4.7	11.3	27.1	4.6	4.4	4.9	22.2	20.7	2.8	14.3	14.3
LnGrp Delay(d),s/veh	33.1	47.4	129.4	101.0	26.6	26.9	76.0	93.4	95.2	33.5	49.1	49.1
LnGrp LOS	C	D	F	F	C	C	E	F	F	C	D	D
Approach Vol, veh/h		565			1043			1239			1053	
Approach Delay, s/veh		78.0			71.6			91.4			47.1	
Approach LOS		E			E			F			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	12.0	36.0	32.0	20.0	12.0	36.0	14.0	38.0				
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	* 29	27.5	14.0	6.5	* 29	9.5	32.0				
Max Q Clear Time (g_c+I1), s	7.1	31.1	29.5	16.0	8.5	27.3	9.8	11.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.8	0.0	4.9				
Intersection Summary												
HCM 2010 Ctrl Delay			72.2									
HCM 2010 LOS			E									
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	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	109	348	228	217	120	174	913	109	902
v/c Ratio	0.30	0.81	0.81	0.47	0.18	0.59	0.69	0.40	0.71
Control Delay	21.6	48.1	45.4	35.5	4.2	26.6	22.8	17.3	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	48.1	45.4	35.5	4.2	26.6	22.8	17.3	17.5
Queue Length 50th (ft)	45	190	101	118	0	54	154	15	101
Queue Length 95th (ft)	75	276	#162	181	33	m90	m231	56	216
Internal Link Dist (ft)		892		573			2708		3361
Turn Bay Length (ft)	100		75			290		200	
Base Capacity (vph)	408	527	283	524	680	299	1320	296	1270
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.66	0.81	0.41	0.18	0.58	0.69	0.37	0.71

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
No Build Conditions

												
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	1900	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	0	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	362	243	165	287	497	514	314	1228	186	289	1194	146
Arrive On Green	0.06	0.23	0.23	0.09	0.26	0.26	0.08	0.39	0.39	0.06	0.37	0.37
Sat Flow, veh/h	1792	1044	711	1792	1881	1599	1792	3114	471	1792	3208	391
Grp Volume(v), veh/h	109	0	348	228	217	120	174	455	458	109	448	454
Grp Sat Flow(s),veh/h/ln	1792	0	1756	1792	1881	1599	1792	1787	1798	1792	1787	1812
Q Serve(g_s), s	4.6	0.0	19.0	9.5	9.6	5.5	5.9	20.7	20.7	3.7	21.0	21.0
Cycle Q Clear(g_c), s	4.6	0.0	19.0	9.5	9.6	5.5	5.9	20.7	20.7	3.7	21.0	21.0
Prop In Lane	1.00		0.41	1.00		1.00	1.00		0.26	1.00		0.22
Lane Grp Cap(c), veh/h	362	0	408	287	497	514	314	705	709	289	665	675
V/C Ratio(X)	0.30	0.00	0.85	0.79	0.44	0.23	0.55	0.65	0.65	0.38	0.67	0.67
Avail Cap(c_a), veh/h	455	0	500	287	525	537	341	705	709	356	665	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.31	0.31	0.31	0.96	0.96	0.96
Uniform Delay (d), s/veh	26.6	0.0	36.7	28.2	30.6	24.9	19.7	24.6	24.6	19.4	26.3	26.3
Incr Delay (d2), s/veh	0.5	0.0	11.3	14.3	0.6	0.2	0.5	1.5	1.4	0.8	5.1	5.1
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	2.3	0.0	10.5	2.7	5.1	2.5	2.9	10.4	10.5	1.8	11.3	11.4
LnGrp Delay(d),s/veh	27.1	0.0	48.0	42.5	31.2	25.1	20.2	26.1	26.1	20.2	31.4	31.4
LnGrp LOS	C		D	D	C	C	C	C	C	C	C	C
Approach Vol, veh/h		457			565			1087			1011	
Approach Delay, s/veh		43.0			34.4			25.1			30.2	
Approach LOS		D			C			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	45.9	14.0	28.8	13.5	43.7	10.8	31.9				
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	9.4	* 31	9.5	* 29	9.4	* 31	11.5	* 28				
Max Q Clear Time (g_c+I1), s	5.7	22.7	11.5	21.0	7.9	23.0	6.6	11.6				
Green Ext Time (p_c), s	0.1	5.8	0.0	2.3	0.1	5.6	0.1	3.5				
Intersection Summary												
HCM 2010 Ctrl Delay			31.1									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

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

Limestone Street Corridor Study
No Build Conditions



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	0.95	0.95	1.00	0.95	0.95
Fr _t		0.887			0.925			0.995			0.996	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1685	0	1805	1758	0	1787	3556	0	1787	3560	0
Fl _t Permitted	0.728			0.566			0.277			0.295		
Satd. Flow (perm)	1383	1685	0	1075	1758	0	521	3556	0	555	3560	0
Satd. Flow (RTOR)		33			22			4			3	
Adj. Flow (vph)	11	11	33	22	22	22	22	880	33	11	902	22
Lane Group Flow (vph)	11	44	0	22	44	0	22	913	0	11	924	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Total Split (s)	15.0	31.0		15.0	31.0		16.0	38.0		16.0	38.0	
Total Lost Time (s)	4.5	5.8		4.5	5.8		4.5	5.9		4.5	5.9	
Act Effect Green (s)	10.6	7.5		12.0	10.0		81.7	81.4		80.6	79.2	
Actuated g/C Ratio	0.11	0.08		0.12	0.10		0.82	0.81		0.81	0.79	
v/c Ratio	0.06	0.28		0.12	0.23		0.04	0.32		0.02	0.33	
Control Delay	33.8	24.5		35.5	27.1		4.8	5.6		1.8	2.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.8	24.5		35.5	27.1		4.8	5.6		1.8	2.2	
LOS	C	C		D	C		A	A		A	A	
Approach Delay		26.3			29.9			5.6			2.2	
Approach LOS		C			C			A			A	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 63 (63%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 5.3

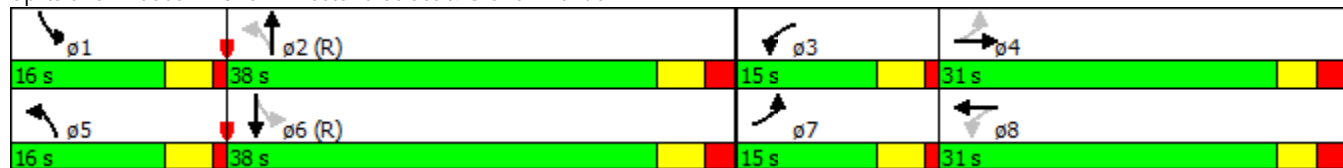
Intersection LOS: A

Intersection Capacity Utilization 41.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: S. Limestone Street & Grand Avenue



Queues
3: S. Limestone Street & Grand Avenue























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	11	44	22	44	22	913	11	924
v/c Ratio	0.06	0.28	0.12	0.23	0.04	0.32	0.02	0.33
Control Delay	33.8	24.5	35.5	27.1	4.8	5.6	1.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	24.5	35.5	27.1	4.8	5.6	1.8	2.2
Queue Length 50th (ft)	7	7	13	14	2	70	0	13
Queue Length 95th (ft)	20	40	31	46	m7	153	m2	57
Internal Link Dist (ft)		727		835		3361		2364
Turn Bay Length (ft)	25		25		150		100	
Base Capacity (vph)	242	449	234	459	575	2894	599	2818
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.10	0.09	0.10	0.04	0.32	0.02	0.33

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
3: S. Limestone Street & Grand Avenue

Limestone Street Corridor Study
No Build Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	10	30	20	20	20	20	810	30	10	830	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	22	22	22	22	880	33	11	902	22
Adj No. of Lanes	1	1	0	1	1	0	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, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	174	27	82	177	67	67	463	2404	90	456	2399	58
Arrive On Green	0.02	0.07	0.07	0.03	0.08	0.08	0.03	0.68	0.68	0.02	0.67	0.67
Sat Flow, veh/h	1810	419	1258	1810	873	873	1792	3513	132	1792	3566	87
Grp Volume(v), veh/h	11	0	44	22	0	44	22	448	465	11	452	472
Grp Sat Flow(s),veh/h/ln	1810	0	1678	1810	0	1746	1792	1787	1858	1792	1787	1866
Q Serve(g_s), s	0.6	0.0	2.5	1.1	0.0	2.4	0.4	10.6	10.6	0.2	11.1	11.1
Cycle Q Clear(g_c), s	0.6	0.0	2.5	1.1	0.0	2.4	0.4	10.6	10.6	0.2	11.1	11.1
Prop In Lane	1.00		0.75	1.00		0.50	1.00		0.07	1.00		0.05
Lane Grp Cap(c), veh/h	174	0	110	177	0	135	463	1223	1271	456	1202	1255
V/C Ratio(X)	0.06	0.00	0.40	0.12	0.00	0.33	0.05	0.37	0.37	0.02	0.38	0.38
Avail Cap(c_a), veh/h	336	0	423	318	0	440	620	1223	1271	634	1202	1255
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.77	0.77	0.77	0.76	0.76	0.76
Uniform Delay (d), s/veh	42.5	0.0	44.8	41.7	0.0	43.7	5.2	6.7	6.7	5.3	7.2	7.2
Incr Delay (d2), s/veh	0.2	0.0	2.3	0.3	0.0	1.4	0.0	0.7	0.6	0.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	1.2	0.6	0.0	1.2	0.2	5.3	5.5	0.1	5.6	5.9
LnGrp Delay(d),s/veh	42.6	0.0	47.2	42.0	0.0	45.1	5.2	7.3	7.3	5.3	7.9	7.8
LnGrp LOS	D		D	D		D	A	A	A	A	A	A
Approach Vol, veh/h		55			66			935			935	
Approach Delay, s/veh		46.3			44.0			7.2			7.8	
Approach LOS		D			D			A			A	
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	6.1	74.3	7.2	12.4	7.2	73.2	6.1	13.5				
Change Period (Y+Rc), s	4.5	* 5.9	4.5	* 5.8	4.5	* 5.9	4.5	* 5.8				
Max Green Setting (Gmax), s	11.5	* 32	10.5	* 25	11.5	* 32	10.5	* 25				
Max Q Clear Time (g_c+I1), s	2.2	12.6	3.1	4.5	2.4	13.1	2.6	4.4				
Green Ext Time (p_c), s	0.0	11.5	0.0	0.4	0.0	11.3	0.0	0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			9.8									
HCM 2010 LOS			A									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
 4: S. Limestone Street & Selma Road & Spring Street

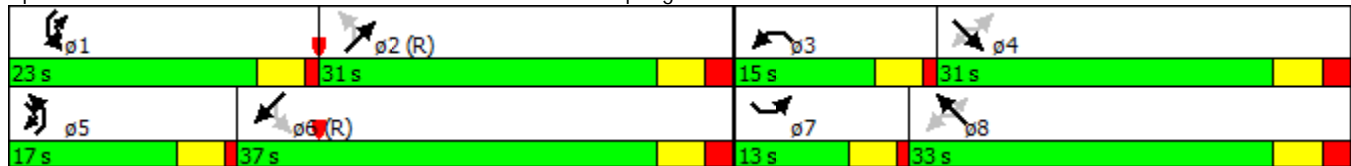
Limestone Street Corridor Study
 No Build Conditions

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	150	310	140	70	310	160	130	640	40	220	630	140
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Fr _t			0.850			0.850		0.991			0.973	
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1810	1538	1687	1776	1509	1736	3440	0	1736	3377	0
Fl _t Permitted	0.332			0.379			0.201			0.167		
Satd. Flow (perm)	601	1810	1538	673	1776	1509	367	3440	0	305	3377	0
Satd. Flow (RTOR)			152			103		6			28	
Adj. Flow (vph)	163	337	152	76	337	174	141	696	43	239	685	152
Lane Group Flow (vph)	163	337	152	76	337	174	141	739	0	239	837	0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4	5	3	8	1	5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Total Split (s)	13.0	31.0	17.0	15.0	33.0	23.0	17.0	31.0		23.0	37.0	
Total Lost Time (s)	4.5	5.9	4.5	4.5	5.9	4.5	4.5	5.8		4.5	5.8	
Act Effect Green (s)	37.7	29.5	45.2	36.9	27.3	47.3	40.7	29.6		48.7	33.9	
Actuated g/C Ratio	0.38	0.30	0.45	0.37	0.27	0.47	0.41	0.30		0.49	0.34	
v/c Ratio	0.51	0.63	0.20	0.23	0.70	0.23	0.50	0.72		0.68	0.72	
Control Delay	25.7	38.5	3.5	19.9	41.5	6.8	30.3	48.4		26.5	32.6	
Queue Delay	0.0	16.6	0.5	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	25.7	55.1	4.0	19.9	41.5	6.8	30.3	48.4		26.5	32.6	
LOS	C	E	A	B	D	A	C	D		C	C	
Approach Delay		35.9			28.4			45.5			31.2	
Approach LOS		D			C			D			C	

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 2 (2%), Referenced to phase 2:NETL and 6:SWTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 35.6
 Intersection LOS: D
 Intersection Capacity Utilization 73.0%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 4: S. Limestone Street & Selma Road & Spring Street



Queues

4: S. Limestone Street & Selma Road & Spring Street


























Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	SWL	SWT
Lane Group Flow (vph)	163	337	152	76	337	174	141	739	239	837
v/c Ratio	0.51	0.63	0.20	0.23	0.70	0.23	0.50	0.72	0.68	0.72
Control Delay	25.7	38.5	3.5	19.9	41.5	6.8	30.3	48.4	26.5	32.6
Queue Delay	0.0	16.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	55.1	4.0	19.9	41.5	6.8	30.3	48.4	26.5	32.6
Queue Length 50th (ft)	66	192	0	29	193	24	67	262	86	235
Queue Length 95th (ft)	112	#319	36	58	294	57	102	#340	150	321
Internal Link Dist (ft)		195			702			2364		1238
Turn Bay Length (ft)				150		150	75		240	
Base Capacity (vph)	321	533	815	369	484	829	330	1020	415	1161
Starvation Cap Reductn	0	182	364	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	0.51	0.96	0.34	0.21	0.70	0.21	0.43	0.72	0.58	0.72

Intersection Summary

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

HCM 2010 Signalized Intersection Summary
 4: S. Limestone Street & Selma Road & Spring Street

Limestone Street Corridor Study
 No Build Conditions

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	150	310	140	70	310	160	130	640	40	220	630	140
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	1810	1810	1810	1776	1776	1776	1827	1827	1900	1827	1827	1900
Adj Flow Rate, veh/h	163	337	152	76	337	174	141	696	43	239	685	152
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, %	5	5	5	7	7	7	4	4	4	4	4	4
Cap, veh/h	305	549	579	285	481	577	302	1081	67	369	1028	228
Arrive On Green	0.09	0.30	0.30	0.05	0.27	0.27	0.07	0.33	0.33	0.11	0.36	0.36
Sat Flow, veh/h	1723	1810	1538	1691	1776	1509	1740	3321	205	1740	2825	627
Grp Volume(v), veh/h	163	337	152	76	337	174	141	364	375	239	421	416
Grp Sat Flow(s),veh/h/ln	1723	1810	1538	1691	1776	1509	1740	1736	1791	1740	1736	1716
Q Serve(g_s), s	6.7	15.9	6.8	3.2	17.1	8.0	5.3	17.9	17.9	8.7	20.3	20.4
Cycle Q Clear(g_c), s	6.7	15.9	6.8	3.2	17.1	8.0	5.3	17.9	17.9	8.7	20.3	20.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.11	1.00		0.37
Lane Grp Cap(c), veh/h	305	549	579	285	481	577	302	565	583	369	632	625
V/C Ratio(X)	0.53	0.61	0.26	0.27	0.70	0.30	0.47	0.64	0.64	0.65	0.67	0.67
Avail Cap(c_a), veh/h	305	549	579	373	481	577	392	565	583	497	632	625
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.3	29.8	21.6	24.8	32.8	21.5	21.4	28.8	28.8	20.3	26.7	26.7
Incr Delay (d2), s/veh	1.8	5.1	1.1	0.5	8.2	1.3	1.1	5.3	5.2	1.9	5.5	5.6
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	3.3	8.7	3.1	1.5	9.4	3.5	2.6	9.4	9.7	4.4	10.7	10.6
LnGrp Delay(d),s/veh	26.2	34.9	22.7	25.3	41.0	22.9	22.5	34.1	34.0	22.2	32.2	32.3
LnGrp LOS	C	C	C	C	D	C	C	C	C	C	C	C
Approach Vol, veh/h		652			587			880			1076	
Approach Delay, s/veh		29.9			33.6			32.2			30.0	
Approach LOS		C			C			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	15.7	38.3	9.8	36.2	11.8	42.2	13.0	33.0				
Change Period (Y+Rc), s	4.5	* 5.8	4.5	* 5.9	4.5	* 5.8	4.5	* 5.9				
Max Green Setting (Gmax), s	18.5	* 25	10.5	* 25	12.5	* 31	8.5	* 27				
Max Q Clear Time (g_c+I1), s	10.7	19.9	5.2	17.9	7.3	22.4	8.7	19.1				
Green Ext Time (p_c), s	0.4	4.0	0.1	3.1	0.2	6.1	0.0	3.4				
Intersection Summary												
HCM 2010 Ctrl Delay			31.2									
HCM 2010 LOS			C									
Notes												
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.												