



Tech Memo: Traffic Operation Analysis at the intersection of US 62/385

July 09, 2021

Project: Seminole Relief Route

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Introduction/Background

This memorandum summarizes the proposed modifications for the US 62/385 intersection at the city of Seminole by providing necessary documentation and supporting analysis. Lubbock District has proposed improvement to relieve congestion at the US 62/385/180 intersection caused by high semi-truck traffic traveling through the city. The established timeline of the project is 2020 to 2045.

The proposed improvements under the Build condition include converting the existing US 385 roadway into a 3-lane, one-way (northbound) roadway as well as converting what is currently 2nd Street into a 3-lane, one-way (southbound) roadway. Lanes would be widened to allow easier turning movements for semi-trucks in this modification. Illegal right turns have been observed in this data collection process, therefore an additional right turn only lane would be built at each intersection. The proposed Build condition incorporates 2% annual growth rate for horizon year 2045.

The No-Build condition was considered as a standard measure to which Build and Existing conditions were compared. Under No-Build condition, current highway will be maintained along with improvements to pavement, sidewalks, and lighting. The No-Build condition incorporates 2% annual growth rate for horizon year 2045.

Methodology

Traffic operations were analyzed for the study intersection including an Existing condition (2020), a No-Build condition (2045) and a Build condition (2045). This section describes the methodology used in the traffic analysis. The Build Option considered here consist of separating the Northbound and Southbound movements as one-way operations along the current alignments of Main Street (US 385) as Northbound and 2nd Street as Southbound. Please see Figure 1 for conceptual limits of the project.

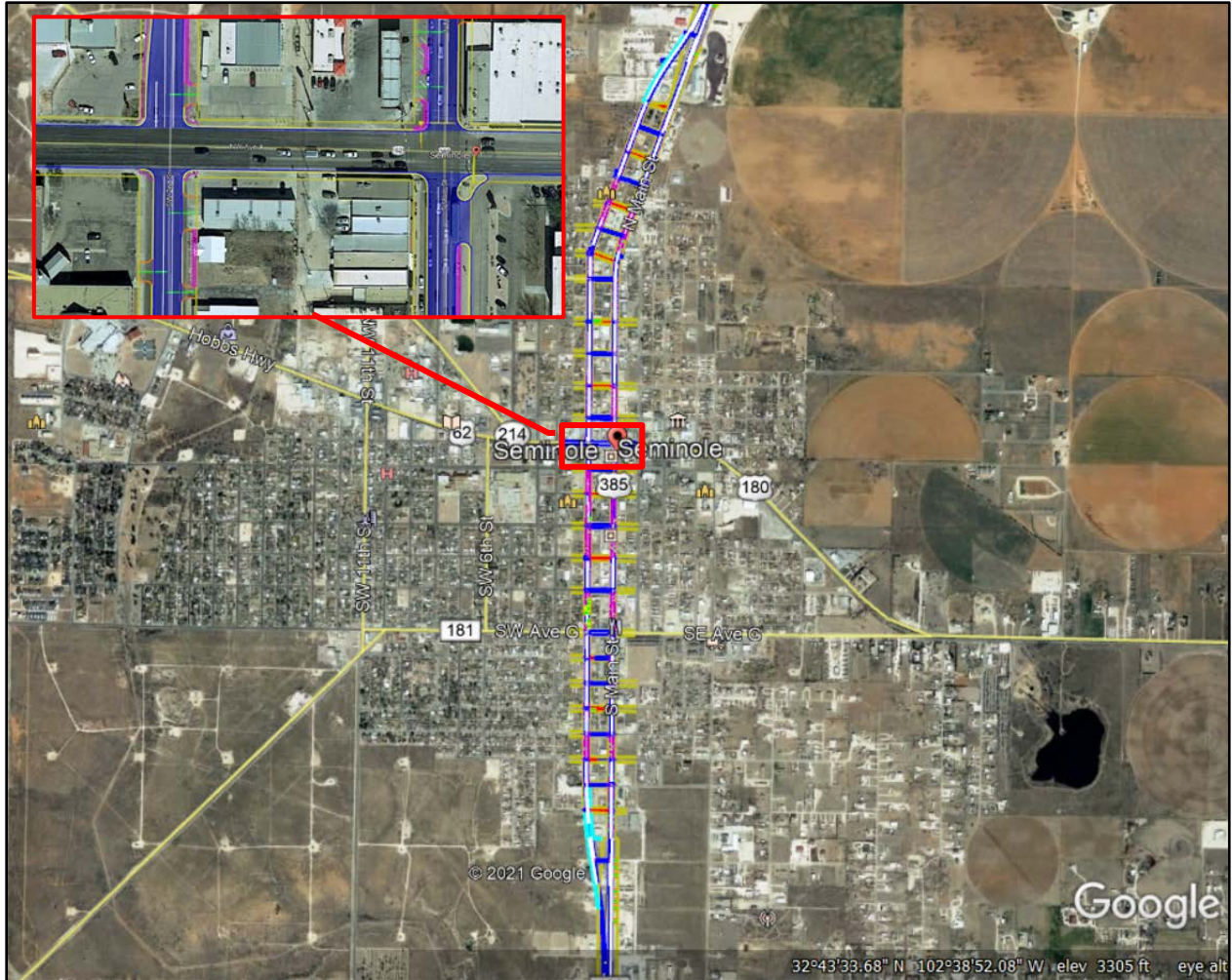


Figure 1: Build Option with Study Intersection

Synchro™ Version 10 was used to perform a capacity analysis at study intersections. The capacity analysis functions in *Synchro* are based on the Transportation Research Board’s Highway Capacity Manual (HCM 6th Edition). The HCM is a nationally recognized standard for performing traffic operations analyses. The reports generated from each *Synchro* model are shown in **Attachment B**.

Capacity analyses are evaluated based on a level of service that ranges from A (excellent) to F (poor). Levels of service A through D are generally considered acceptable and levels of service E and F are considered unacceptable. The level of service thresholds in the Highway Capacity Manual for signalized intersections are shown in **Table 1**.

Table 1. Intersection Level of Service Thresholds

Level of Service (LOS)	Control Delay Per Vehicle (seconds)
	Signalized Intersection
A	≤10
B	10 to 20
C	20 to 35
D	35 to 55
E	55 to 80
F	>80

Traffic Volume

The following Traffic analysis was created based on traffic data received from the Lubbock District. Expected traffic in 2045 is predicted to increase by 65% based on traffic growth calculations. Please note that the data collection effort for this project had limitations due to pandemic and resources. The Traffic volume data is shown in **Attachment A**.

Traffic Operation Analysis

The results of the Existing condition (2020), No-Build condition (2045) and Build condition (2045) operation analysis are shown in **Table 2**.

Table 2. Traffic Operations Analysis

#	Intersection	Control Type	Approach /Movement	Existing (2020)		No-Build (2045)		Build (2045)	
				Level of Service (Delay (Seconds))					
				Approach	Overall	Approach	Overall	Approach	Overall
1	US 62/US 180 @ US 385	Signalized	EB	E (72.3)	E (62.4)	F (266.8)	F (227.0)	C (20.5)	C (33.0)
			WB	F (91.1)		F (331.9)		E (74.9)	
			NB	D (53.2)		F (210.1)		C (32.5)	
			SB	D (49.9)		F (156.4)			
2	US 62/US 180 @ 2nd Street	Signalized	EB					D (39.0)	C (32.8)
			WB					B (10.7)	
			NB						
			SB					D (42.4)	

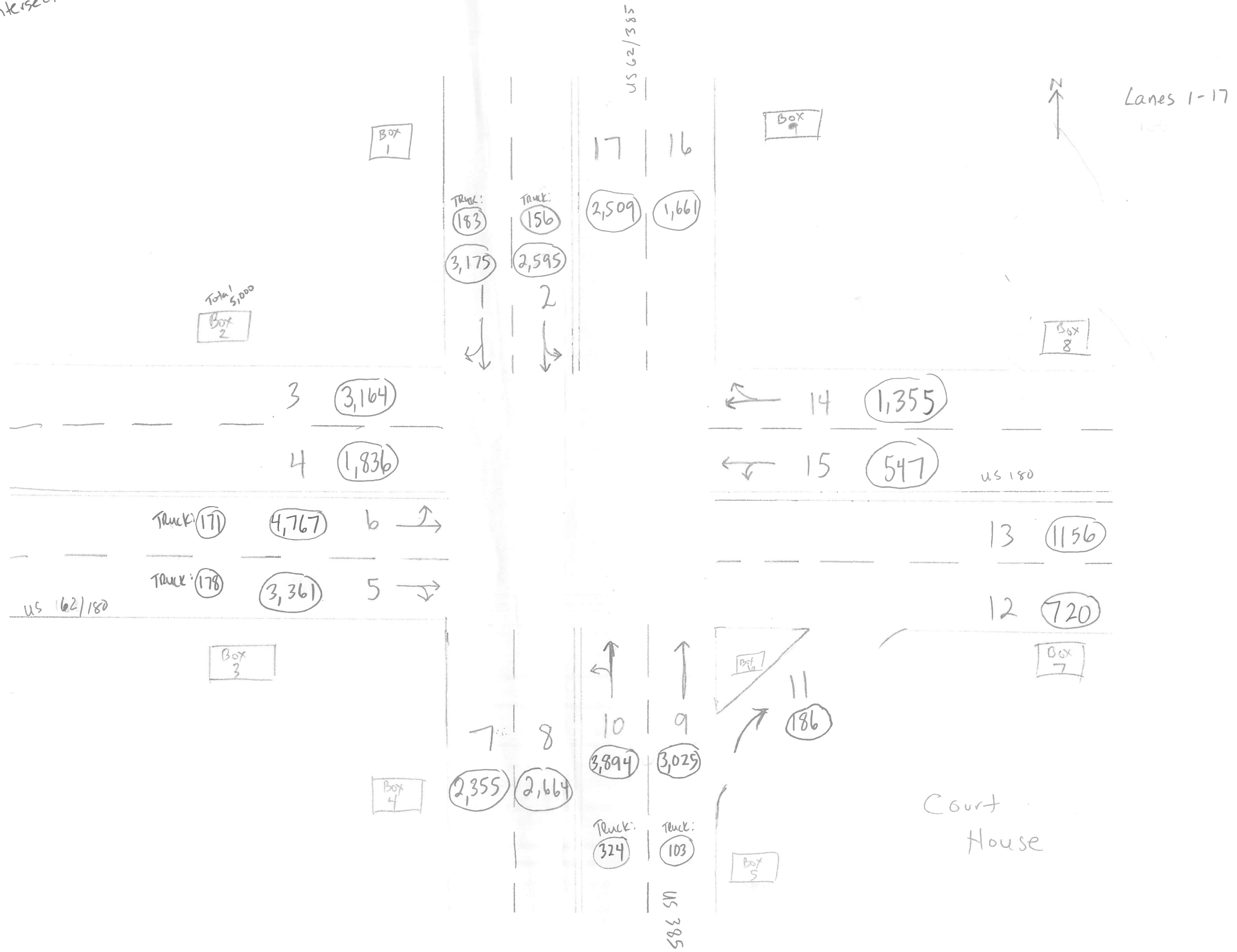
The results in **Table 2** show that the proposed improvements under the Build condition at the US 62/US180 @ US 385 intersection are anticipated to improve the level of service to LOS C.

Conclusions

For this study, traffic analyses were performed for the the Existing condition (2020), No-Build condition (2045) and Build condition (2045). It is anticipated that with the full Build-out of the corridor, traffic operations at the study intersections would improve to operate at acceptable levels of service “C”.

Attachment A

Seminole
Intersection



Assumptions

1. K-Factor 10%
2. 2% Annual Growth Rate
3. Traffic distribution between two intersections for Build 2045 condition
4. Traffic Balance

















Daily Traffic Volume						
	Approaching		Total	Receiving		Total
NB	3894	3025	6919	2509	1661	4170
SB	3175	2595	5770	2355	2664	5019
EB	4767	3361	8128	1156	720	1876
WB	1355	547	1902	3164	1863	5027

Design Hour Volume												
	NB			SB			EB			WB		
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
2020 DHV	312	362	19	144	375	58	203	262	348	19	152	19
2045 DHV	512	594	31	236	615	95	333	430	571	31	249	31

Attachment B

















HCM 6th Signalized Intersection Summary
 1: US 385 & US 180/US 62

Seminole Relief Route

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	262	348	19	152	19	312	362	19	144	375	58
Future Volume (veh/h)	203	262	348	19	152	19	312	362	19	144	375	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	221	285	378	21	165	21	339	393	21	157	408	63
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	7	7	7	6	6	6
Cap, veh/h	214	277	401	23	185	25	362	457	25	183	501	80
Arrive On Green	0.26	0.26	0.26	0.06	0.06	0.06	0.24	0.24	0.24	0.22	0.22	0.22
Sat Flow, veh/h	807	1046	1516	351	2865	380	1502	1895	102	840	2304	370
Grp Volume(v), veh/h	493	0	391	109	0	98	388	0	365	331	0	297
Grp Sat Flow(s),veh/h/ln	1800	0	1568	1823	0	1772	1721	0	1778	1769	0	1745
Q Serve(g_s), s	22.5	0.0	20.8	5.1	0.0	4.7	18.8	0.0	16.6	15.3	0.0	13.7
Cycle Q Clear(g_c), s	22.5	0.0	20.8	5.1	0.0	4.7	18.8	0.0	16.6	15.3	0.0	13.7
Prop In Lane	0.45		0.97	0.19		0.21	0.87		0.06	0.47		0.21
Lane Grp Cap(c), veh/h	477	0	415	118	0	115	415	0	429	385	0	380
V/C Ratio(X)	1.03	0.00	0.94	0.92	0.00	0.86	0.94	0.00	0.85	0.86	0.00	0.78
Avail Cap(c_a), veh/h	477	0	415	118	0	115	415	0	429	385	0	380
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.3	0.0	30.6	39.5	0.0	39.4	31.6	0.0	30.8	32.0	0.0	31.4
Incr Delay (d2), s/veh	50.4	0.0	29.9	59.4	0.0	43.1	28.6	0.0	14.9	21.3	0.0	14.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.0	0.0	11.0	4.2	0.0	3.4	10.8	0.0	8.7	8.6	0.0	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.6	0.0	60.5	99.0	0.0	82.4	60.2	0.0	45.7	53.3	0.0	46.2
LnGrp LOS	F	A	E	F	A	F	E	A	D	D	A	D
Approach Vol, veh/h		884			207			753			628	
Approach Delay, s/veh		72.3			91.1			53.2			49.9	
Approach LOS		E			F			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		23.0		10.0		25.0		27.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.5		5.5		20.5		22.5				
Max Q Clear Time (g_c+I1), s		17.3		7.1		20.8		24.5				
Green Ext Time (p_c), s		0.5		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay											62.4	
HCM 6th LOS											E	

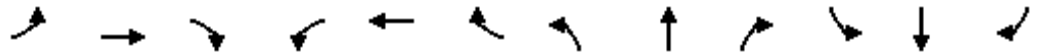
Lanes, Volumes, Timings
1: US 385 & US 180/US 62

Seminole Relief Route

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	262	348	19	152	19	312	362	19	144	375	58
Future Volume (vph)	203	262	348	19	152	19	312	362	19	144	375	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.936			0.985			0.996			0.985	
Flt Protected		0.988			0.995			0.978			0.988	
Satd. Flow (prot)	0	3210	0	0	3402	0	0	3286	0	0	3314	0
Flt Permitted		0.988			0.995			0.978			0.988	
Satd. Flow (perm)	0	3210	0	0	3402	0	0	3286	0	0	3314	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		216			11			3			13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		992			1078			910			866	
Travel Time (s)		22.5			24.5			20.7			19.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	221	285	378	21	165	21	339	393	21	157	408	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	884	0	0	207	0	0	753	0	0	628	0
Turn Type	Split	NA		Split	NA		Split	NA		Split	NA	
Protected Phases	8	8		4	4		6	6		2	2	
Permitted Phases												
Detector Phase	8	8		4	4		6	6		2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		16.0	16.0		22.5	22.5		22.5	22.5	
Total Split (s)	27.0	27.0		10.0	10.0		25.0	25.0		23.0	23.0	
Total Split (%)	31.8%	31.8%		11.8%	11.8%		29.4%	29.4%		27.1%	27.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Lead/Lag	Lag	Lag		Lead	Lead		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		Min	Min		C-Min	C-Min	
Act Effect Green (s)		21.9			5.8			20.8			18.5	

Lanes, Volumes, Timings
1: US 385 & US 180/US 62

Seminole Relief Route



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.26			0.07			0.24			0.22	
v/c Ratio		0.89			0.86			0.94			0.86	
Control Delay		35.8			70.6			52.5			44.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		35.8			70.6			52.5			44.6	
LOS		D			E			D			D	
Approach Delay		35.8			70.6			52.5			44.6	
Approach LOS		D			E			D			D	

Intersection Summary

















Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	85
Offset:	0 (0%), Referenced to phase 2:SBTL, Start of Green
Natural Cycle:	85
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	46.0
Intersection LOS:	D
Intersection Capacity Utilization:	80.8%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 1: US 385 & US 180/US 62

Ø2 (R)	Ø6	Ø4	Ø8
23 s	25 s	10 s	27 s

















HCM 6th Signalized Intersection Summary
 1: US 385 & US 180/ US 62

Seminole Relief Route

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	333	430	571	31	249	31	512	594	31	236	615	95
Future Volume (veh/h)	333	430	571	31	249	31	512	594	31	236	615	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1796	1796	1796	1811	1811	1811
Adj Flow Rate, veh/h	362	467	621	34	271	34	557	646	34	257	668	103
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	7	7	7	6	6	6
Cap, veh/h	243	314	443	22	182	24	406	512	27	210	576	92
Arrive On Green	0.30	0.30	0.30	0.06	0.06	0.06	0.27	0.27	0.27	0.25	0.25	0.25
Sat Flow, veh/h	817	1059	1495	347	2873	376	1502	1896	101	839	2305	370
Grp Volume(v), veh/h	797	0	653	179	0	160	638	0	599	542	0	486
Grp Sat Flow(s),veh/h/ln	1800	0	1572	1823	0	1773	1721	0	1778	1769	0	1745
Q Serve(g_s), s	44.5	0.0	44.5	9.5	0.0	9.5	40.5	0.0	40.5	37.5	0.0	37.5
Cycle Q Clear(g_c), s	44.5	0.0	44.5	9.5	0.0	9.5	40.5	0.0	40.5	37.5	0.0	37.5
Prop In Lane	0.45		0.95	0.19		0.21	0.87		0.06	0.47		0.21
Lane Grp Cap(c), veh/h	534	0	466	115	0	112	465	0	480	442	0	436
V/C Ratio(X)	1.49	0.00	1.40	1.55	0.00	1.43	1.37	0.00	1.25	1.22	0.00	1.11
Avail Cap(c_a), veh/h	534	0	466	115	0	112	465	0	480	442	0	436
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.8	0.0	52.8	70.3	0.0	70.3	54.8	0.0	54.8	56.3	0.0	56.3
Incr Delay (d2), s/veh	231.5	0.0	192.8	285.1	0.0	235.4	181.3	0.0	127.6	120.0	0.0	78.2
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	54.4	0.0	42.5	13.6	0.0	11.7	40.9	0.0	35.1	31.5	0.0	26.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	284.3	0.0	245.5	355.3	0.0	305.7	236.1	0.0	182.4	176.2	0.0	134.4
LnGrp LOS	F	A	F	F	A	F	F	A	F	F	A	F
Approach Vol, veh/h		1450			339			1237			1028	
Approach Delay, s/veh		266.8			331.9			210.1			156.4	
Approach LOS		F			F			F			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		42.0		14.0		45.0		49.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		37.5		9.5		40.5		44.5				
Max Q Clear Time (g_c+I1), s		39.5		11.5		42.5		46.5				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay												227.0
HCM 6th LOS												F





















Lanes, Volumes, Timings
1: US 385 & US 180/ US 62

Seminole Relief Route

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
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Future Volume (vph)	333	430	571	31	249	31	512	594	31	236	615	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor												
Frt		0.936			0.985			0.996			0.985	
Flt Protected		0.988			0.995			0.978			0.988	
Satd. Flow (prot)	0	3210	0	0	3402	0	0	3286	0	0	3314	0
Flt Permitted		0.988			0.995			0.978			0.988	
Satd. Flow (perm)	0	3210	0	0	3402	0	0	3286	0	0	3314	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		128			6			2			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		992			1078			910			866	
Travel Time (s)		22.5			24.5			20.7			19.7	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	362	467	621	34	271	34	557	646	34	257	668	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1450	0	0	339	0	0	1237	0	0	1028	0
Turn Type	Split	NA		Split	NA		Split	NA		Split	NA	
Protected Phases	8	8		4	4		6	6		2	2	
Permitted Phases												
Total Split (s)	49.0	49.0		14.0	14.0		45.0	45.0		42.0	42.0	
Total Lost Time (s)		4.5			4.5			4.5			4.5	
Act Effct Green (s)		44.5			9.5			40.5			37.5	
Actuated g/C Ratio		0.30			0.06			0.27			0.25	
v/c Ratio		1.39			1.53			1.39			1.23	
Control Delay		218.1			304.4			224.1			160.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		218.1			304.4			224.1			160.9	
LOS		F			F			F			F	
Approach Delay		218.1			304.4			224.1			160.9	
Approach LOS		F			F			F			F	
Intersection Summary												
Area Type:	Other											

Lanes, Volumes, Timings
1: US 385 & US 180/US 62

Seminole Relief Route

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			  				
Traffic Volume (vph)	333	666	0	0	280	31	512	594	31	0	0	0
Future Volume (vph)	333	666	0	0	280	31	512	594	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.985				0.850			
Flt Protected		0.984						0.977				
Satd. Flow (prot)	0	3416	0	0	3419	0	0	4736	1509	0	0	0
Flt Permitted		0.631						0.977				
Satd. Flow (perm)	0	2190	0	0	3419	0	0	4736	1509	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					9				213			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		341			1078			399			1686	
Travel Time (s)		7.8			24.5			9.1			38.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	7%	7%	7%	6%	6%	6%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	362	724	0	0	304	34	557	646	34	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1086	0	0	338	0	0	1203	34	0	0	0
Turn Type	Prot	NA			NA		Perm	NA	Free			
Protected Phases	5	5 6			6			8 16				
Permitted Phases							8 16		Free			
Total Split (s)	47.0				15.0							
Total Lost Time (s)					4.5							
Act Effct Green (s)		53.0			10.5			33.5	100.0			
Actuated g/C Ratio		0.53			0.10			0.34	1.00			
v/c Ratio		0.73			0.92			0.99dl	0.02			
Control Delay		19.1			74.9			33.4	0.0			
Queue Delay		1.4			0.0			0.0	0.0			
Total Delay		20.5			74.9			33.4	0.0			
LOS		C			E			C	A			
Approach Delay		20.5			74.9			32.5				
Approach LOS		C			E			C				
Intersection Summary												
Area Type:	Other											

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Lane Width (ft)						
Grade (%)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor						
Ped Bike Factor						
Frt						
Flt Protected						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor						
Growth Factor						
Heavy Vehicles (%)						
Bus Blockages (#/hr)						
Parking (#/hr)						
Mid-Block Traffic (%)						
Adj. Flow (vph)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Turn Type						
Protected Phases	1	2	4	8	12	16
Permitted Phases						
Total Split (s)	23.0	51.0	11.0	23.0	15.0	15.0
Total Lost Time (s)						
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Intersection Summary						

Lanes, Volumes, Timings
 1: US 385 & US 180/US 62

Seminole Relief Route













Cycle Length: 100
 Actuated Cycle Length: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 33.0 Intersection LOS: C
 Intersection Capacity Utilization 76.4% ICU Level of Service D
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 1: US 385 & US 180/US 62

51 s		11 s		15 s		23 s	
15 s	47 s			15 s		23 s	

Lanes, Volumes, Timings
2: 2nd Street & US 180/US 62

Seminole Relief Route

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑						↑↑↑	↑
Traffic Volume (vph)	0	763	571	31	761	0	0	0	0	236	615	95
Future Volume (vph)	0	763	571	31	761	0	0	0	0	236	615	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		100
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor												
Frt		0.936										0.850
Flt Protected					0.998						0.986	
Satd. Flow (prot)	0	3313	0	0	3532	0	0	0	0	0	5014	1583
Flt Permitted					0.788						0.986	
Satd. Flow (perm)	0	3313	0	0	2789	0	0	0	0	0	5014	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		253										213
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1801			341			379			1995	
Travel Time (s)		40.9			7.8			8.6			45.3	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	829	621	34	827	0	0	0	0	257	668	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1450	0	0	861	0	0	0	0	0	925	103
Turn Type		NA		Prot	NA					Perm	NA	Free
Protected Phases		2		1	1 2						4 12	
Permitted Phases										4 12		Free
Total Split (s)		51.0		23.0								
Total Lost Time (s)		4.5										
Act Effct Green (s)		46.5			65.0						21.5	100.0
Actuated g/C Ratio		0.46			0.65						0.22	1.00
v/c Ratio		0.87			0.77						0.86	0.07
Control Delay		26.3			10.7						47.1	0.1
Queue Delay		12.7			0.0						0.0	0.0
Total Delay		39.0			10.7						47.1	0.1
LOS		D			B						D	A
Approach Delay		39.0			10.7						42.4	
Approach LOS		D			B						D	
Intersection Summary												
Area Type:	Other											

Lane Group	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Lane Width (ft)						
Grade (%)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor						
Ped Bike Factor						
Frt						
Flt Protected						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor						
Growth Factor						
Heavy Vehicles (%)						
Bus Blockages (#/hr)						
Parking (#/hr)						
Mid-Block Traffic (%)						
Adj. Flow (vph)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Turn Type						
Protected Phases	4	5	6	8	12	16
Permitted Phases						
Total Split (s)	11.0	47.0	15.0	23.0	15.0	15.0
Total Lost Time (s)						
Act Effct Green (s)						
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Intersection Summary						

Lanes, Volumes, Timings
 2: 2nd Street & US 180/US 62

Seminole Relief Route

Cycle Length: 100
 Actuated Cycle Length: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 32.8
 Intersection LOS: C
 Intersection Capacity Utilization 67.9%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2: 2nd Street & US 180/US 62

51 s		11 s		15 s		23 s	
15 s		47 s		15 s		23 s	